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# SUPPLEMENT

TO THE

## SANITARY REPORT

OF THE

## PROVINCE OF ASSAM

FOR THE

YEAR 1912.



SHILLONG :

PRINTED AT THE ASSAM SECRETARIAT PRINTING OFFICE .

1913.





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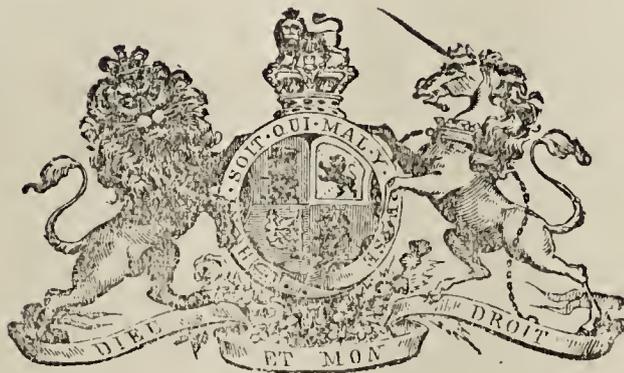
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FROM

CAPTAIN L. B. SCOTT, M.D., I.M.S.,  
CIVIL SURGEON, SYLHET,

TO

THE INSPECTOR GENERAL OF CIVIL HOSPITALS, ASSAM.

*Dated Sylhet, the 7th April 1913.*

SIR,

I HAVE the honour to forward herewith my report on the results of Nastic treatment in the Sylhet Leper Asylum for 1912.

I have the honour to be,

SIR,

Your most obedient Servant,

L. B. SCOTT, *Captain, I.M.S.,*

*Civil Surgeon, Sylhet.*



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# REPORT ON THE TREATMENT OF LEPROSY BY NASTIN IN THE SYLHET LEPER ASYLUM FOR THE YEAR 1912.

(BY CAPTAIN L. BODLEY SCOTT, B.A., M.D., D.P.H., I.M.S.)

This is a continuation of my report for 1911 and previous years.

Nastin has now been in continuous use in this asylum for  $3\frac{1}{2}$  years. To begin with, only a few cases were placed under its treatment. The number was gradually increased and since July 1911 every leper in the asylum has been given Nastin. The cost to Government in 1912 for Nastin alone was Rs. 1,420.

Thirty-five patients have received this treatment in the asylum during 1912 and 44 since 1909 when it was first introduced.

In addition to these I shall include in this report five cases whom I have treated outside the asylum among the coolies of a tea garden (Lakatura) close to Sylhet. The company who own the garden have borne the expense of their treatment.

I now therefore have the notes of 49 lepers treated in Sylhet by Nastin, 46 of whom have come under my own observation. A reference to Table (1) will show that—

43 cases have been under treatment for 6 months or over.

26 ditto ditto 1 year „

5 ditto ditto 2 years „

The average length of treatment is 13 months.

I think therefore it may be said that the data on which this report is based are of considerable value and are sufficient to warrant some definite conclusions as to the value of Nastin. So far as I am able to ascertain only one more extensive trial of Nastin has hitherto been published, *viz.*, from the Mahaica Leper Asylum in British Guiana.

## THE METHODS OF THE ASYLUM DURING 1912.

During the past year I had the permission of Government to buy as much Nastin as I could use. Weekly injections were therefore regularly given to every case in the asylum with a very few intermissions in individual patients.

Injections are made with an all-glass syringe which is kept, after preliminary sterilisation, in ether. Only the needle is re-sterilised in a flame before each injection.

These are made intramuscularly in the interscapular region. The skin is sterilised with iodine.

So far as possible every case has been microscopically confirmed. A few cases have presented no lesion for examination, and others have remained unconfirmed because it is found that scrapings from the chronic ulcers usually give negative results. Patients in whom such ulcers are the only likely source of bacilli possibly require more frequent re-examination than I have been able to make in order to get a positive result.

All cases with "tubercular" lesions have yielded bacilli at the first search.

Re-examination during the course of treatment has been carried out in most cases.

There can be no doubt about the diagnosis of leprosy in any of the cases presented in this report.

Notes have been systematically and carefully kept, mostly by myself. A form is used for this purpose which ensures that no symptom of leprosy shall escape investigation.

The patients have been regularly weighed at the time of each injection.

Temperature and pulse records have not been regularly taken. This was an impossible undertaking with the staff at my disposal. I do not think information of much value would have been obtained.

Photographs are an usual embellishment of reports on the treatment of leprosy. I am doubtful of their scientific value and have not had the Sylhet cases photographed. To do so would have been a matter of some difficulty and expense in a place so far removed from the centres of civilisation. Photographs often convey an erroneous impression of the progress made. It is difficult to take two photographs at an interval of several months under the same conditions of light and attitude. Only the grossest naked eye changes can be reliably depicted and not all of these. For instance, the

lepromatous thickening of a leper's face may completely subside and yet the leonine appearance sometimes persists owing to the fact that loose pendulous folds of skin remain where the nodular thickening of the subcutaneous tissues have vanished. This change is very evident to the touch, but often not so obvious to the eye and quite indiscernible in a photograph.

I have paid careful attention to mapping out the extent of anæsthesia and recording its changes from time to time. It is not easy to obtain reliable results, partly owing to lack of intelligence in the patients and partly because the anæsthetic areas actually seem to vary in size from day to day. Other observers of leprosy have noticed the same difficulties. For purposes of comparison I now confine myself to an accurate description of the areas in which hot and cold cannot be distinguished, with general notes on the other forms of anæsthesia. The thermic sense lends itself to accurate delimitation better than the other sensory functions. The results of testing the sense of touch are often most unsatisfactory.

The same methods have been used in recording observations on the five leper coolies treated on Lakatura tea estate. I have made all their notes myself.

*Dosage, etc.*—I have not experimented with the dose or strength of Nastin. I have used only Nastin B and a full tube at each injection. I have not deliberately tried Professor Deycke's latest plan of intermittent treatment.

Before 1912 the Sylhet asylum cases received irregular but approximately fortnightly doses. During 1912 they have received very regular weekly doses. The Lakatura cases have received quite irregular doses, the interval averaging about 3 weeks. My impression is that the irregular fortnightly doses have given the best results, but I can produce no facts in evidence of this. I am returning to fortnightly doses in the asylum in 1913 and shall try intermissions in some of the old cases.

I may say here that I have been extremely careful to obtain impartial notes. I have never noted improvement in any respect without good reasons for doing so. In arriving at an estimate of the net results in each case, I have first made a careful computation of the changes in each separate symptom as recorded in Table (2). I have then taken these together with the general impressions obtained from watching and questioning the patients and based my conclusions on the combined data.

I feel confident that I have not erred in the direction of exaggerating improvement. In many cases in fact, whose general leprous condition had in my opinion considerably improved, I have recorded a less favourable or bad result owing to the persistence or recurrence of some one symptom or to loss of health due to dysentery or some other intercurrent disease.

TABLE (1).  
Summary of results for 1909 to 1912.

Length of time under treatment.	"Cured,"	Greatly improved.	Considerably improved.	Somewhat improved.	Stationary.	Worse.	Remarks.
1	2	3	4	5	6	7	8
Three years and over ...	1	...	...	...	...	...	
Two and a half years and over.	...	1	...	...	...	...	
Two years and over ...	...	2	...	...	...	1	
One and a half years and over	1	1	1	...	...	...	
One year and over ...	3+1	3	3	5	1	1+1*	*Two cases worse, due to intercurrent dysentery. Leprous symptoms had improved.
Nine months and over ...	...	2+2	4	2+1	...	1	
Six months and over ...	1	1	2	1	...	...	
Under 6 months ...	1	...	2	1	1	1	
Totals ...	4+4 =8	10+2 =12	12	9+1 =10	2	3+2 =5	=49

The roman figures show the results during 1912.

The italic figures show the results of the cases discharged during 1910 and 1911.

"Cured" means complete restoration of health, strength and working power with loss of every symptom which causes inconvenience or incapacity. It does not mean in every case complete disappearance of every sign of leprosy.

## GENERAL RESULTS.

Table (1) summarises the results for 1912 and also for the whole period during which Nastin has been used in Sylhet.

The notes of the cases I append, as in my 1911 report, in the form of a tabular abstract which contains details in some fulness of all the important symptoms before and after treatment. A brief perusal of these abstract notes will convey an accurate idea of the results obtained. Fuller notes of all the 40 cases would be of altogether unreadable length.

I now proceed to make some remarks on the main features of the results and on some individual cases.

*The immediate effects of Nastin injections.*

During 1912 no case has developed suppuration or serious inflammation at the site of injection. In 1911 one case developed an abscess.

As a rule there is no constitutional reaction. A few cases have had fever after an injection with a sudden increase of their pains. This has not usually happened after the first injection but after some weeks of treatment. In one or two cases it has happened more than once.

Local reaction in the leprous lesions has very rarely been seen. In two cases the lepromata became swollen and painful after an injection which was not the first.

The patients very frequently say that they feel lighter and more active after the first few injections. A sense of well-being seems to be an early effect of Nastin in most cases.

*Cures.*

The following cases were either discharged as cured by the board appointed under the Leper Act (No. III of 1898) or are considered by me to be cured so far as to have recovered good general health, to have lost all symptoms which cause inconvenience or incapacity and to be able to resume their ordinary work or occupation.

(1) *Ram Das*, case (2) of my 1911 report, treated for 7 months, had 29 injections. On admission he was very weak, had anæsthesia, patches and other symptoms. Discharged in May 1910, feeling quite well and able to do hard work. His anæsthesia and other symptoms, except possibly a few patches, were all cured. Discharged by the Board as cured.

(2) *Jash Bahadur*, case (16) of my 1911 report, treated for 1½ years, had 36 injections. On admission he had leonine features, lepromata about the body, anæsthesia and other symptoms. Discharged by the Board as "cured" in January 1911, feeling much better, thickening of features, lepromata and anæsthesia all much improved. Since leaving the asylum he has married a wife, made a home for himself in Sylhet (he is a Nepali) and earned his living by driving a bullock cart. He was examined by me in February 1913, 2 years and 2 months after his last dose of Nastin, and found to be in perfect health and full possession of all his faculties with no sign of leprosy about him.

(3) *A. Dur*, case (3) of my 1911 report, treated for 1 year and 2 months, had 50 injections. Admitted weak and anæmic with thickening of features, anæsthesia, contraction and loss of use of his fingers, etc. Discharged by the Board as cured in May 1911, feeling strong and well and able to work with his hands, thickening and patches cured, anæsthesia greatly improved. This man has been seen several times since his discharge. He occasionally comes to Sylhet from his home in the Khasi Hills. He was last seen by my Assistant Surgeon in the rains of 1912 rather more than a year after finishing his course of treatment. He was not thoroughly examined, but stated that he was in perfect health and able to do hard work. He complained of no return of any symptom of leprosy. He had been received back into society in his village where formerly he was outcasted as a leper according to the custom of his people, the Khasis.

(4) *Kaloo Jola*, case (12) of my 1911 report, treated for 4 months, 9 injections. Admitted weak with pains, anæsthesia, patches, ulcers, etc. Discharged by the Board as cured in May 1911, able to do any amount of labourious work and cured of all symptoms except some patches. He has not been seen since.

(5) *Prokash Ram*, case (1) of 1912, notes in this report. Treated for 3½ years, 121 injections. His was a severe case of tubercular leprosy. He had been in the asylum for a year before Nastin was begun without improvement, was extremely weak and had various severe symptoms.

He now considers himself cured and has left the asylum in January 1913 to earn his living as a cart-driver. Recently, while still in the asylum, he has frequently earned a full day's wage at brick making or coolie work. All his symptoms are now cured except the anæsthesia. His face still has a somewhat leonine appearance on account of the loose folds of skin left where the nodular thickenings have subsided. He is scarred and some deformity of his hands and feet remains. It is to be noted that some fresh lepromata appeared in May 1912 and that bacilli were found in one of these as recently as October 1912 after more than two years' treatment.

(6) *Bishon*, case (8) of 1912, treated for 1 year and 4½ months, had 56 injections. Notes in this report. Was very weak and had well marked tubercular leprosy with anæsthesia and patches. Now he can do a full day's work and feels as well as he ever did. He has a few small tubercles remaining and his features still appear leonine, though all palpable thickening has vanished. Other symptoms cured.

It is to be noted that a few scattered and faintly acid fast bacilli were found in a tubercle in March 1913 as compared with the usual deeply stained masses of bacilli found in June 1912 in a similar tubercle.

(7) *Barneswar*, case (11) of 1912, treated for 1 year and 3 months, had 51 injections. Notes in this report. Was weak, could walk only 2 miles and had the symptoms of nerve leprosy. He left the asylum of his own accord in October 1912 having regained normal strength and working power. The only symptoms remaining were some anæsthesia, patches and thickening of the ulnar nerves.

(8) *Jangmit*, case (13) of 1912, treated for 1 year and 2 months, had 38 injections. Notes in this report. An early case of mixed leprosy. She was cured of all symptoms except some faint remaining patches. She died of cholera in May 1912 during an epidemic which affected the town and 4 cases in the asylum.

#### *Deaths.*

Four deaths occurred in the asylum during 1912. Two of these were due to cholera and took place in May when an epidemic invaded Sylhet town and attacked 4 patients in the asylum. One of these lepers who died of cholera is not included in the notes on which this report is based, as he received only 3 doses of Nastin.

The other two deaths were both due to gangrene. One of the patients, case (35), was admitted to the asylum in an almost moribund condition with bed-sores. He received Nastin for 2½ months. Then gangrene supervened and carried him off. The other patient, case (23), a severe case of nerve leprosy, was under treatment for 10 months. He improved for a time but then got fever, hæmaturia and finally gangrene of the right foot and died.

Previous to 1912 three deaths occurred among patients under Nastin treatment. Case (13) of 1911, Manik Singh, died of cholera after having greatly improved as regards his leprosy. Case (7) of 1911, Sadoy, died of dysentery. His leprosy condition was, I believe, in no way responsible for his death. He had improved steadily during his treatment of one year and 5 months and showed no increase of his leprosy lesions before death. I have nevertheless shown him as worse at the end of treatment in Table (1), because it cannot be definitely asserted that his death was entirely unconnected with leprosy.

The third death in 1911 occurred in an extremely severe case of tubercular leprosy, case (4) of 1911, Jadab. He was under treatment for two years and improved for about 1½ years. In the last six months of his life he became gradually weaker and developed some fresh leprosy lesions and finally died with dysenteric symptoms.

Since 1909 therefore, when Nastin was first introduced, only three patients under its treatment, and possibly a very doubtful fourth, can be said to have died of leprosy; and one of these was admitted in a nearly moribund condition, dying within 2½ months.

#### *Cases which have got worse.*

Five cases are shown as having got worse under treatment in Table (1). Four of these are the four deaths just mentioned. The fifth is case (14) of the attached notes. In reality as regards his leprosy symptoms he is not worse; most of them have improved. But he has suffered lately from dysentery and has lost strength and 14lbs. in weight. I have shown him as worse although there is no reason to connect his loss of health with leprosy.

Out of these five cases, therefore, two were worse because of intercurrent dysentery and one, admitted nearly moribund, died within 2½ months.

#### *Cases unaltered by treatment.*

Two are shown as stationary in Table (1), both in the 1912 results. Ram Charan,

case (9), is an advanced case of nerve leprosy with much deformity of his feet. He has been under treatment for 16 months. Several of his symptoms have slightly improved and he looks well, but he says he feels a little weaker. I have therefore shown him as stationary. He is certainly not worse.

*Kabil*, case (31), was under treatment for  $5\frac{1}{2}$  months. He left the asylum before a complete note of progress was made. I have shown him as stationary because his notes record only some slight and unimportant changes, some for the better and some for the worse. He was certainly not worse on the whole when he left the asylum.

#### *Arrest of progress.*

This has perhaps been the most striking result of Nastin treatment in Sylhet. In only three cases out of the 49 has the leprosy condition definitely advanced. In two others the patient has become worse due to intercurrent dysentery.

In a few other cases individual symptoms have got worse or a few fresh leprosy lesions have appeared, while the disease as a whole was improving. I will mention these symptoms in detail.

The sexual power diminished in two cases, No. (9), who in some other respects improved and whom I have shown as stationary on the whole, and No. 18, who on the whole improved slightly.

Thickening of features is noted as slightly increased in one case, No. (31), at the end of 4 months' treatment.

Lepromata were in no case worse at the end of treatment than at the beginning. In all except one they were improved. But in 7 cases, Nos. 1, 2, 8, 15, 21 and 26 of 1912 and 4 of 1911, fresh lepromata made their appearance during treatment. In four of these they appeared only during the early stages of treatment, but in three up to considerable periods (34, 22, and  $14\frac{1}{2}$  months) after Nastin was begun. In only one, case 15, were they still coming out at the end of 1912.

Patches are noted as worse in 3 cases. In case (4) fresh raised reddish maculæ are still coming out after 2 years' treatment. In case (28), treated for 7 months, some fresh maculæ have appeared recently. In case (31) the patches were noted as slightly increased after 4 months' treatment.

Ulceration became worse in the case (No. 35), who died of gangrene  $2\frac{1}{2}$  months after admission, and in case 4 of 1911, Jadab, referred to under the heading "deaths." In no other case has the ulceration become worse as a whole, though some patients have developed a few fresh ulcers while the old ones were healing, usually as the result of burns or abrasions.

Contraction of the fingers was noted as rather worse at the end of 2 years' treatment in one case, No. 3.

Laryngeal ulceration developed as a new symptom in case No. 4 of 1911, Jadab, mentioned under "deaths."

With these exceptions no case out of the 49 has developed any fresh leprosy lesion or become worse in respect of any leprosy symptom since being put under Nastin treatment. This is a very striking fact.

TABLE (2)

*Showing the results of treatment on 14 of the main symptoms of leprosy.*

Name of patient and number in abstract notes.	General condition.		Loss of sexual power.	Weight.	Diffuse thickenings.	Lepromata.	Anæsthesia.	Patches.	Ulceration.	Muscular atrophy.	Contractures.	Eye symptoms.	Nasal symptoms.	Enlargement of lymph glands.	Month of treatment.	Net results.	
	Pains.																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
(1) Prokash Bam	...	C.	C.	C.	-4	C.	C.	G. I.	C.	C.	...	...	...	...	...	42	"Cured."
(2) Kul Mistri...	...	I.	I.	I.	+8	G. I.	G. I.	I.	...	C.	...	...	...	St.	...	30	Greatly improved.
(3) Ghasia	...	G. I.	C.	G. I.	St.	...	...	G. I.	G. I.	C.	...	W.	...	...	...	24	Ditto.
(4) Karim Shekh	...	G. I.	G. I.	St.	-10	G. I.	C.	I.	W.	C.	...	...	...	...	...	24	Ditto.
(5) Anuk Nath	...	I.	G. I.	St.	St.	...	...	St.	St.	C.	...	...	I.	C.	...	21	Considerably improved

TABLE (2)—concl'd.

Name of patient and number in abstract notes.	General condition.	Pains.	Loss of sexual power.	Weight.	Diffuse thickening.	Lepromata.	Anaesthesia.	Patches.	Ulceration.	Muscular atrophy.	Contractures.	Eye symptoms.	Nasal symptoms.	Enlargement of lymph glands.	Months of treatment.	Net results.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(6) Bapa Ram...	G. I.	C.	C.	St.	G. I.	I.	G. I.	...	G. I.	...	...	...	G. I.	...	20	Greatly improved.
(7) Chandra Kishore Sarma	G. I.	G. I.	G. I.	-4	...	...	I.	I.	G. I.	G. I.	St.	...	...	...	17	Ditto
(8) Bishon ...	C.	C.	C.	-5	G. I.	I.	G. I.	G. I.	...	...	...	...	...	...	16	"Cured."
(9) Ram Charan ...	St.	I.	W.	-2	St.	...	St.	I	St.	St.	I.	...	...	...	16	Stationary.
(10) Rang Lal ...	I.	C.	I.	+6½	I.	...	I.	...	I.	...	...	...	...	...	16	Considerably improved.
(11) Barneswar ...	C.	C.	C.	+1	...	...	G. I.	St.	...	...	...	...	...	...	15	"Cured."
(12) Kinkor ...	G. I.	G. I.	C.	St.	G. I.	...	I.	I.	St.	G. I.	I.	...	...	...	15	Considerably improved.
(13) Yangmit ...	...	C.	...	-2	C.	C.	C.	G. I.	...	...	...	...	...	...	14	"Cured."
(14) Chamra ...	W.	C.	...	-14	St.	...	I.	...	St.	St.	St.	...	...	...	14	Worse.
(15) Horai Ram ...	I.	G. I.	St.	+6	C.	St.	St.	...	I.	...	...	...	...	I.	14	Considerably improved.
(16) Magha ...	St.	?	?	-8	I.	...	St.	...	I.	...	...	?	...	...	13	Some improvement.
(17) Toona ...	I.	I.	C.	-6	...	...	I.	I.	St.	...	I.	...	...	...	13	Ditto.
(18) Golak Mali...	St.	G. I.	W.	St.	St.	C.	St.	...	I.	...	...	...	St.	St.	13	Ditto.
(19) Abdul Rahim	G. I.	I.	...	-2	I.	...	St.	G. I.	I.	...	...	...	...	G. I.	11	Considerably improved.
(20) Hira ...	I.	.	...	+8	...	...	I.	G. I.	I.	...	I.	...	...	I.	11	Some improvement.
(21) Bishahin ...	I.	G. I.	St.	+1	G. I.	I.	I.	I.	G. I.	I.	...	I.	...	...	11	Considerably improved.
(22) Jagdeo Kurmi	G. I.	I.	G. I.	-3	I.	...	G. I.	G. I.	I.	...	I.	...	C.	...	10	Greatly improved.
(23) Kishtoma ...	W.	I.	?	+2	...	...	I.	...	St.	St.	...	...	...	...	10	Worse.
(24) Chiarmon ...	I.	G. I.	...	-5	...	...	I.	G. I.	...	...	...	I.	...	...	99	Considerably improved.
(25) Narsin ...	I.	I.	I.	-6	...	...	I.	G. I.	I.	...	...	...	...	I.	9	Ditto.
(26) Asar ...	G. I.	...	...	-1	G. I.	I.	I.	I.	C.	...	...	...	I.	St.	9	Greatly improved.
(27) Kailash Mall	St.	C.	St.	St	C.	...	I.	I.	C.	...	...	...	St.	St.	77	Considerably improved.
(28) Balo Miri ...	St.	I.	...	+6	I.	St.	G. I.	W.	...	...	...	...	...	I.	7	Ditto.
(29) Muladhar ...	G. I.	I.	I.	+10	G. I.	I.	I.	...	C.	...	...	I.	...	...	6	Greatly improved.
(30) Kamala Kanta	St.	...	...	-8	I.	I.	I.	St.	...	...	...	...	...	St.	6	Some improvement.
(31) Kabil ...	I.	I.	...	-2	W.	...	?	W.	...	...	...	...	...	...	5	Stationary.
(32) Churamoni...	I.	I.	I.	St.	I.	...	I.	C.	...	...	...	...	I.	St.	4	Considerably improved.
(33) Durga Koch	I.	G. I.	...	+8	...	...	St.	...	G. I.	...	St.	...	...	I.	4	Ditto.

*Cases treated on Lakatura tea estate.*

(36) Rabi ...	I.	...	C.	+4	...	...	G. I.	G. I.	...	...	...	...	...	...	16	Greatly improved.
(37) Budha ...	G. I.	I.	I.	+1	G. I.	G. I.	I.	...	C.	...	...	...	...	...	16	Ditto.
(38) Chandmoni	I.	I.	...	St.	...	...	I.	I.	...	...	...	...	...	...	15	Some improvement.
(39) Margu ...	I.	I.	...	+5	...	...	I.	...	G. I.	...	I.	...	...	...	14	Ditto.
(40) Goonamoni	I.	...	...	+4	...	...	I.	I.	...	...	...	...	...	...	9½	Ditto.

*Asylum cases discharged before 1912.*

Jadab ...	W.	I.	...	...	I.	I.	I.	...	W.	...	...	...	...	...	24	Worse.
Jash Bahadur ...	G. I.	...	...	...	I.	I.	I.	...	...	...	...	...	...	...	18	"Cured."
Shodoy ...	W.	I.	I.	...	I.	I.	?	...	St.	...	...	...	I.	...	15	Worse.
A. Dur ...	G. I.	...	...	...	G. I.	...	G. I.	G. I.	...	...	G. I.	...	...	...	14	"Cured."
Manik Singh ...	I.	G. I.	I.	...	G. I.	I.	I.	...	I.	...	...	...	C.	...	10	Greatly improved.
Mestha ...	G. I.	...	...	...	?	...	I.	...	...	...	...	...	...	...	9	Ditto.
Ali Mohamad ...	I.	...	...	...	I.	...	St.	?	St.	...	?	...	I.	...	9	Some improvement.
Ram Das ...	C.	...	C.	...	C.	...	I.	G. I.	...	...	...	...	...	...	7	"Cured."
Kalu Jola ...	C.	?	...	...	?	...	C.	G. I.	C.	...	...	...	...	...	4	Ditto.

C.=Cured.  
St.=Stationary.G. I.=Greatly improved.  
W.=Worse.I.=Improved.  
?=Doubtful.

## ANALYSIS OF THE EFFECTS OF NASTIN ON THE VARIOUS SYMPTOMS.

For the purpose of the following analysis of symptoms I shall take only those cases which have been under treatment for 4 months and over, that is, a total of 47 cases.

I have selected 14 symptoms which I consider the most prominent in leprosy and the most frequently complained of by the patients. Table (2) shows for each patient the result of treatment on each of these symptoms complained of. The letters used indicate the followings results:—

C.=cured. G. I.=greatly improved. I.=improved. St.=Stationary. W.=worse. ?=doubtful.

A dash means symptom not present or not recorded.

The mark "doubtful" is used where for some reason it has been impossible to determine the result, generally because the patient has left the asylum before a note could be taken.

I shall now comment on the changes observed in each symptom separately.

(a) *Loss of general health and strength.*—Results:—

Cured	...	...	...	...	5 = 1.09 per cent.
Greatly improved	...	...	...	...	13 = 28.3 "
Improved	...	...	...	...	18 = 39.1 "
Stationary	...	...	...	...	6 = 13.0 "
Worse	...	...	...	...	4 = 8.7 "
			Total	...	<u>46</u> <u>100.00</u>

Of the four cases whose general health became worse, two were improved as regards their leprosy condition but were attacked by intercurrent dysentery from which one died and the other lost 14 lbs. in weight. Their leprosy therefore was probably not responsible for their deterioration in health. The two others died and their death may be ascribed to an advance of their leprosy.

An all-round improvement of the patients' health was a marked feature of the results. A sense of well-being seemed to be an early effect of Nastin in nearly every case, while a more cheerful demeanour and a general increase of energy have been lasting results in the majority. An improvement in strength and working power has also been most evident. A glance through the abstract notes will show that several patients who were almost bedridden can now walk long distances, while others who were incapable of any work can now labour all day with a *kodati* (native spade) or *dao* (hatchet).

(b) *Weight.*—The weight of the 1911 cases was not recorded. Regular weighing was only begun at the end of 1911. Hence many of the patients were under Nastin treatment for considerable periods before any record of their weights was made. Actually, during 1912, 14 cases gained weight, 16 lost weight and 8 remained stationary.

Intercurrent dysentery was to blame in the two cases who lost most weight and this was probably unconnected with their leprosy. Deducting these two an equal number lost and gained weight, and the average lost was 3.8 lbs., while the average gained was 5 lbs., giving a net balance of 17½ lbs. gained.

I do not regard loss or gain of weight as an indication of much value in judging the progress of a leper under treatment. Loss of weight frequently means improvement in the thickening of the feet, legs and hands which is so common a symptom, or reduction in the bulk of the lepromatous growths. Cure of these conditions may often represent a loss of several pounds in weight. Some of the Sylhet cases, who have made the greatest improvement, have lost weight considerably, e.g., cases 1 (4 lbs.), 7 (4 lbs.), 8 (5 lbs.), and 22 (3 lbs.).

Gain of weight may mean improved general health, but emaciation is not a marked symptom of uncomplicated leprosy in its less advanced stages. On the other hand, it might mean an increase of swelling and lepromatous growths, though it was not due to this in any of the Sylhet cases.

In thus examining the changes in weight and general health we must take into consideration the conditions under which the lepers live in such an asylum as that of Sylhet. These are by no means all good. The patients are exposed to infection by what may be called "asylum diseases" without the protection which strict control and sanitation afford in such institutions as jails and lunatic

asylums. They are nearly all voluntary inmates and very little restraint is exercised over their movements or habits. They are free to come and go and to eat or drink whatever they may obtain in bazars or elsewhere. They are given sufficient food in the asylum with good housing, good latrines and a fairly satisfactory tank for drinking water. Their houses are usually kept clean and the grounds and surroundings are always clean and neat. The lepers however often prefer to drink dirty river water and by no means always use their latrines. They beg in the bazars and eat much unwholesome food in addition to or instead of the asylum diet.

It is not therefore surprising that dysentery and cholera often attack them. In 1912 there were 4 cases of cholera in the asylum during an epidemic in the town. Two of these cases died and the two who recovered have scarcely yet thrown off the effects (cases 24 and 25). Cases 4, 14 and 25 have had dysentery in 1912 and have all lost weight in consequence. Three or four other cases have had dysenteric attacks and suffered in general health. During 1911 also there were cases of dysentery and cholera.

(c) *Pains*.—These are very common symptoms. Patients usually describe them as gnawing, dragging or tingling pains. They are often so bad as to cause sleeplessness, a very frequent complaint of lepers. The effect of Nastin in curing the pains is most marked and is perhaps the point on which patients lay most stress in describing their progress. Loss of pain and a return of natural sleep mean a very great deal to them.

Among 38 patients who complained of pains there were:—

Cured	...	...	...	...	9 = 23·6 per cent.
Greatly improved	...	...	...	...	10 = 26·4 „
Improved	...	...	...	...	17 = 44·7 „
Doubtful	...	...	...	...	2 = 5·3 „
Stationary or worse	...	...	...	...	0 = 0·0 „
			Total	...	38 100·0

(d) *Loss of sexual power*.—This occurs sooner or later in almost every case of leprosy. Very often it is quite an early symptom which the patient notices before he remarks any great loss of strength. For this reason I am inclined to regard it as one of the nervous lesions of leprosy rather than a result of general loss of health, but both causes probably operate. I include under this heading both impotence and loss of sexual appetite. The two usually go together, but may be separately developed in some cases.

The symptom is much remarked by the patient and he equally readily remark the return or strengthening of his sexual power. He can almost always give a very definite and decided answer when questioned on the subject. The female patients are not as a rule interrogated.

We are of course entirely dependent on the patient for an opinion as to the changes in this symptom, but I regard it nevertheless as a valuable test of progress.

Out of 28 patients who complained of loss of sexual power, there were:—

Cured	...	...	...	...	8 = 28·6 per cent.
Greatly improved	...	...	...	...	3 = 10·6 „
Improved	...	...	...	...	8 = 28·6 „
Stationary	...	...	...	...	5 = 18·0 „
Worse	...	...	...	...	2 = 7·1 „
Doubtful	...	...	...	...	2 = 7·1 „
			Total	...	28 100·0

One of those who remained stationary is an old man of over 60.

(e) *Diffuse thickening*.—Under this heading I include diffuse thickenings in the region of the eyebrows, forehead, malar prominences, *alæ nasi* and ears, which are common apart from the formation of definite lepromatous nodules, the thickening of the skin over the elbows, knees, scrotum and penis and enlargement of the nipples. I also include the hard swelling or enlargement of the feet, ankles and hands which is a marked feature in many cases. I exclude definite nodule formation which I regard as a separate and distinct manifestation of leprosy.

I may be wrong in classing the above two kinds of thickenings together as homologous symptoms, but they form a convenient group and a concrete manifestation of leprosy which can be observed by the physician as to its changes without the aid of the patient and is therefore of much value in estimating the effect of treatment.

The results among 33 patients showing these symptoms were:—

Cured	...	...	...	...	5 = 15·15 per cent.
Greatly improved	...	...	...	...	11 = 33·33 „
Improved	...	...	...	...	11 = 33·33 „
Stationary	...	...	...	...	3 = 9·09 „
Worse	...	...	...	...	1 = 3·03 „
Doubtful	...	...	...	...	2 = 6·07 „
Total					33 100·00

(f) *Lepromata*.—These form a very characteristic and distinct symptom of leprosy which particularly lends itself to accurate observation by the physician without the aid of the patient. They are purely cutaneous lesions. Some are very superficial, while others form in the deep layers of the skin. Some are scarcely bigger than a large pin's head; others are as large as a pigeon's egg. The small variety are sometimes innumerable in number. The large ones are often quite few. They form very quickly and often come out in crops. They always contain large masses of bacilli.

Out of 17 cases with lepromata, there were:—

Cured	...	...	...	...	4 = 23·6 per cent.
Greatly improved	...	...	...	...	2 = 11·7 „
Improved	...	...	...	...	9 = 53·0 „
Stationary	...	...	...	...	2 = 11·7 „
Worse	...	...	...	...	0 = 0 „
Total					17 100·0

As regards the development of fresh lepromata during treatment, see my remarks above under the heading "Arrest of progress."

(g) *Anæsthesia*.—The testing of anæsthesia might be thought to furnish unequivocal evidence, independently of the patients' own opinions, as to its increase or decrease under treatment. Actually however there are considerable difficulties in the way of getting accurate results. All the tests depend on the patients' intelligence and power of mental concentration which are often very deficient in the class of inmates found in a leper asylum.

The application of hot and cold test tubes for mapping out the areas of loss of thermic sense is the test which gives the best results. Even for this the intelligence of the patients is sometimes insufficient. They soon get tired if the test is at all prolonged and say *garm* (hot) or *thanda* (cold) at random.

On the whole I regard the patient's opinion as to the extent of his anæsthesia as of almost equal value to the judgment of the examining physician. In several of the Sylhet asylum cases whose early notes were not very complete, the patient's opinion is almost the only evidence to go on. He generally has a very definite opinion as to whether his anæsthesia has improved or not and can say with accuracy where his sense of touch is lost and where it has returned under treatment.

Every one of the 47 cases had anæsthesia. The results of treatment were:—

Cured	...	...	...	...	2 = 4·25 per cent.
Greatly improved	...	...	...	...	9 = 19·15 „
Improved	...	...	...	...	26 = 55·33 „
Stationary	...	...	...	...	8 = 17·02 „
Worse	...	...	...	...	<i>Nil.</i>
Doubtful	...	...	...	...	2 = 4·25 „
Total					47 100·0

(h) *Patches*.—Under this heading I include—(1) the slightly raised, flat, reddish macular eruptions. These may be small, not bigger than an eight-anna bit; or

they may be large and irregular, covering perhaps half the skin of a limb. When they subside, they may disappear altogether or they may gradually turn into (2) the usually large irregular patches of discolouration. These are not raised. Usually they show loss of pigment, but sometimes an increase. They are often very indistinct and difficult to define, though usually there is a sharp linear border on one or other side of the patch when it is distinct enough to be called a patch. On the other hand, they may be very plain, due to a marked change in the consistency of the affected skin, which is either rough and scaly or thin, wrinkled and cicatricial in appearance. The well marked patches are usually anæsthetic, but faint ones are often not.

The effect of treatment has been very decided in many patients. Normal pigmentation has returned and scaly, wrinkled and thickened skin has become smooth and soft. Patches in which the skin was not structurally damaged have disappeared completely. The results among 30 cases with patches were :—

Cured	...	...	...	...	2 = 6.6 per cent.
Greatly improved	...	...	...	...	12 = 40.0 "
Improved	...	...	...	...	9 = 30.0 "
Stationary	...	...	...	...	3 = 10.0 "
Worse	...	...	...	...	3 = 10.0 "
Doubtful	...	...	...	...	1 = 3.4 "
					— ———
			Total	...	30 100.0
					— ———

Under the heading "Arrest of progress" I have made some remarks regarding the cases whose patches became worse.

(i) *Ulceration*.—The ulcers may be divided into three kinds, *viz.* :—(1) The ulcerating lepromata containing many bacilli. These have been very few in the cases here recorded, because under Nastin the lepromata rarely proceed to ulceration. (2) The chronic trophic, often "perforating," ulcers which are commonest on the soles of the feet. Bacilli are very rarely found in these. (3) What I may call the casual ulcers due to abrasions or burns of the anæsthetic parts.

All these are included under this heading. Thirty-two cases had ulceration. The results of treatment were :—

Cured	...	...	...	...	10 = 31.3 per cent.
Greatly improved	...	...	...	...	5 = 15.8 "
Improved	...	...	...	...	9 = 28.1 "
Stationary	...	...	...	...	7 = 21.8 "
Worse	...	...	...	...	1 = 3.1 "
					— ———
			Total	...	32 100.0
					— ———

The only patient whose ulcers became worse was Jadab, case 4 of 1911, the most severe case under treatment, who finally died. In a few cases fresh ulcers have formed *pari pasu* with the healing of old ones. In the chronic trophic ulcers the healing process is often very slow and takes many months to accomplish. In a few cases who have otherwise improved the ulcers have failed to respond to treatment.

(j) *Muscular atrophy*.—This affects first and most the thenar, hypothenar and interosseous muscles of the hand, next those of the forearms and leg below the knee. In one case, a clerk, the first symptom noticed was inability to write due to wasting of the hand muscles. The patient was not aware that he had leprosy till he came to me for a medical certificate.

Definite muscular atrophy was noted in 6 cases of this series, of whom—

- 2 were greatly improved,
- 1 was improved,
- 3 remained stationary.

A very marked increase in the size and strength of the wasted muscles took place in two cases.

(k) *Contractures*.—By this I mean the contraction of fingers eventually proceeding to the formation of "claw hand." In several cases under Nastin the fingers have become looser and straighter and the patients have to a large extent recovered the use of their hands, especially the power to cut bamboos with a *dai*, a thing of

much importance to them. One patient recovered the power to write which he had lost. Of 12 cases with contractures, there were :—

Greatly improved	...	...	...	...	...	1
Improved	...	...	...	...	...	6
Stationary	...	...	...	...	...	3
Worse	...	...	...	...	...	1
Doubtful	...	...	...	...	...	1
						—
				Total	...	12
						—

(l) *Eye symptoms*.—In only 5 patients were the eyes affected. They had night-blindness, general dimness of vision, conjunctivitis or keratitis. Four were improved and the result in one was doubtful.

(m) *Nasal symptoms*.—These include ulceration, nasal obstruction (not cicatricial) and discharges. Eleven patients had one or other of these symptoms. There were :—

Cured	...	...	...	...	...	3
Greatly improved	...	...	...	...	...	1
Improved	...	...	...	...	...	4
Stationary	...	...	...	...	...	3
						—
				Total	...	11
						—

(n) *Enlargement of lymph glands*.—The glands most affected are the femoral and inguinal. This symptom was noted in 11 patients. The results were :—

Greatly improved	...	...	...	...	...	1
Improved	...	...	...	...	...	5
Stationary	...	...	...	...	...	5
						—
				Total	...	11
						—

A few other symptoms besides those included in Table (2) need notice.

(o) *Thickening of nerves*, especially the ulnar nerves, was present in a great many of the cases. Very little change either for the better or the worse was observed to take place under treatment. In one case I noticed a slight reduction in the size of the ulnar nerves.

(p) *Loss of perspiration* in the patches and anæsthetic areas was complained of by several of the patients and its return under treatment was remarked by many of them.

(q) *Loss of hair* is also common. In several patients hair has ceased to fall out and has in some regrown where it had practically disappeared.

(r) *The bacilli*.—Some observers have attempted to estimate the progress of a case of leprosy by the number of bacilli found, their conformation and degree of acid-fastness before and after treatment.

I have seen no account of any practical method of estimating the number of bacilli and I fail to see how an estimate of any value can be made. The number found depends very largely on the lesion examined, its stage of development and the portion of it from which the "scraping" is taken. Tubercles, especially fresh ones, if deeply incised, always yield large masses of bacilli which would be quite impossible to count; while old tubercles yield fewer and ulcers very few or none at all. It is rarely possible to examine the same lesion at the beginning and the end of treatment, and even if it were possible, there is no reason to associate any changes found in the bacilli with the treatment in use at the time. Both their number, shape and degree of acid-fastness probably vary in the same lesion apart from any treatment according as it is a fresh and active or an old and subsiding one.

In this report therefore I make no attempt to draw conclusions from the results of bacteriological findings, but I may remark here that in cases 6, 7, and 16 of 1912 and 12 of 1911 bacilli were found in the ulcers in the earlier examinations but not in the later; while the reverse occurred in cases 25 and 27. In cases 2, 8, 26, 28, and 30 the bacilli in later examinations were either fragmentary and beaded or appeared to have lost some of their acid-fastness, or masses of acid-fast shapeless debris were found.

It cannot even be ascertained whether the acid-fast bacilli found are alive or dead. Hence the finding of bacilli is no complete proof that the disease is not eradicated. Even supposing we grant that all acid-fast bacilli are or recently were in the living state, this is no proof that the disease is not cured. In "cured" cases of tuberculosis we know that living tubercle bacilli are frequently still present in some part of the patient's body.

#### CONSIDERATION OF RESULTS.

It has been suggested by some observers that the good effects of Nastin, often seen within two or three months of beginning treatment, are only temporary and are due to the tonic effect of suggestion and hope on the patient's mind and, through his mind, on his general health and power of resistance. The patients are said by some to have been very pleased with the Nastin treatment at first, but afterwards to have become disappointed with it.

It has also been said that the improvements recorded under Nastin may be only the natural fluctuations in progress of a disease whose course is by no means always steadily down hill and which is not rarely seen to come to a standstill and even improve under any form of treatment or no treatment at all.

One observer has suggested that the good results reported may be due to the admission of wandering pauper lepers to an asylum where a regular life with good food and hygiene takes the place of their former hand-to-mouth existence.

These are the lines on which the favourable reports on Nastin treatment have been criticised by those who have not been so successful with it. I wish to carefully consider the Sylhet results from these points of view.

My conclusions are as follows :—

(I) The improvement which has taken place in the majority of the Sylhet patients has not proved to be only temporary. It has lasted under my own observation for two to three years in 7 out of 8 cases watched for that period and for one to two years in 16 out of 17 others.

It has not been due to the advantages of asylum life. Few of the inmates are wandering beggars or outcasts. Many of them have their homes and most led a healthy and sufficiently well-fed life before admission. Many of them moreover were in the asylum for several years before commencing Nastin treatment. The five Lakatura lepers were treated outside the asylum and continued their previous mode of existence without any change. Moreover the conditions of life in the asylum are by no means all good from a hygienic point of view. As pointed out above the patients have lost as much in health from exposure to infection by "asylum diseases" as they are likely to have gained from good food.

(II) The patients have not become disappointed after a few months. They are still anxious for more Nastin after one, two and even three years' treatment. Since the first injections were given after considerable persuasion in 1909, no further difficulty has arisen in getting patients to submit to the treatment though it is quite voluntary. One or two cases have made temporary objections, but no leper in whom I have commenced Nastin treatment has ever refused to continue it. On the contrary they are usually anxious to proceed and are disappointed if for any reason a dose is omitted.

The five leper coolies, treated quite voluntarily on Lakatura tea estate, have willingly continued Nastin treatment for a year and 4 months, and have attended regularly, some of them from considerable distances, to receive their injections.

(III) The question of the possible effects of suggestion and hope is a difficult one to deal with. Positive evidence one way or the other is naturally very hard to produce.

Nastin treatment appears to have been well received by the patients of all asylums in which it has been tried. Certainly in Sylhet those who first tried it were very pleased with the results and within a short time all the other patients were clamouring for Nastin. Since then every patient who has come to the asylum has either already heard of Nastin or is immediately told of its virtues by the older inmates and is infused with hope and the expectation of receiving benefit himself.

This enthusiasm however was certainly started to begin with by tangible and evident improvement in the condition of the first cases. If the benefits which the patients say they derive, and certainly do derive, from Nastin were solely the result of suggestion or hope, I hardly think this enthusiasm would have been maintained in asylum for  $3\frac{1}{2}$  years among patients who are most of them old inmates, nor do I think

the patients who have received injections for more than one, two, and even three years would have maintained their improvement and their liking for Nastin for such a length of time.

Moreover the five Lakatura cases had no communication with the asylum and could not have had their hopes aroused by other patients before commencing treatment. Yet they have derived as much benefit from Nastin as the asylum patients and have willingly continued treatment for a year and 4 months. The Manager of the garden is most pleased with the results in these patients and considers his expenditure on Nastin repaid by the increased amount of work which he gets out of them.

If we take the different symptoms of leprosy, there are some, such as the pains, sleeplessness, loss of health and loss of sexual power, which we might regard as specially amenable to suggestion; while it is more difficult to see how suggestion or hope could affect the more definite organic lesions, such as the lepromata, anæsthesia, cutaneous patches, muscular atrophy and ulcers. Yet in the Sylhet cases the latter group of symptoms have been at least as much benefited by Nastin as the former.

I feel sure myself that hope and suggestion are quite insufficient to account for the marked and sustained improvement seen in so many cases.

(IV) Are the results of the Sylhet cases, namely:—

40·8	per cent.	“cured”	or greatly improved,
45·0	„	improved,	
14·2	„	stationary or worse,	

such as might be expected in the natural course of leprosy treated by any other method or not treated at all?

I hardly think any one would say this. My own experience of leprosy untreated by Nastin has not been very great, but if such a tendency to cure and improvement were its natural course, the disease would hardly have acquired the evil reputation which it has. The painful picture drawn of the course and prognosis of leprosy and its various symptoms in Allbutt's system of medicine is a very different one from that seen by me among the Sylhet lepers undergoing Nastin treatment.

(V) Can Nastin be regarded as a cure for leprosy?

In the sense in which Salvarsan is a cure for syphilis it certainly cannot. The majority of fairly advanced cases of leprosy are not “cured” by Nastin even after two years' treatment, though they may be much improved. On the other hand, a certain proportion are “cured.” Among the Sylhet cases treated for over 4 months this proportion was 17 per cent. and the “cured” patients were by no means all early or slight cases.

I have been careful throughout this report not to make unqualified use of the word “cured” in connection with the net results of treatment on the patients. In many of the “cured” cases a scientific cure in the sense of eradication of all living lepra bacilli from the system and complete recovery of all the functions has probably not taken place. Among the “cured” cases, Prokash Ram still yielded acid-fast bacilli in October 1912 and Bishon a small number of faintly acid-fast bacilli in February 1913, but the exact significance of this fact is doubtful as pointed out above in the analysis of symptoms. Some of the other cured cases had a few unimportant symptoms remaining.

But if we take “cure” as meaning complete restoration of health, strength and working power with loss of all troublesome or crippling symptoms, there is no doubt that all the eight cases were cured. From the patient's point of view, this certainly constitutes a cure and this is the sense in which I have used the word in this report.

One of the eight, and perhaps only one, I can certify to be a complete and perfect cure in every sense of the word and permanent up to two years from the cessation of treatment. This is Jash Bahadur (see under “cures”).

Of the patients who are still under treatment some, I consider, are on the way to being “cured” and may hope for this result by the time they have completed one or two years' treatment. The 17 per cent. of “cures” up to date therefore does not represent the full possibilities. If asked to make a numerical estimate based on the Sylhet figures of the proportion of cases who may expect to be “cured” by Nastin, I should say, roughly, 20 per cent.

(VI) What evidence is there of the permanence of the 8 “cures” effected?

*Jash Bahadur* was examined by me in February 1913, 2 years and 2 months after finishing his course of 1½ years' treatment, and found to be in perfect health and full possession of all his faculties with no sign of leprosy about him.

*A. Dur* was seen by my Assistant Surgeon a year and 2 or 3 months after finishing his course of 14 months' treatment. He complained of no return of any symptom of leprosy and stated that he was in perfect health and able to do hard work.

*Prokash Ram* was practically cured, in the qualified sense of the term described above, by the end of 1911 after  $2\frac{1}{2}$  years' treatment. He has maintained this improvement during 1912 while remaining under treatment and has now left the asylum to earn his living as a cart-driver in Sylhet. I hope to be able to keep him under observation therefore.

Of the other 5 "cured" cases, 2 discharged in 1910 and 1911 have been lost sight of. In 2 the "cure" has been only recently completed, and the fifth died of cholera. I think it most probable that the two patients lost sight of would have returned for further treatment if their disease had relapsed.

There is thus some evidence of the permanence of the "cure" up to a period of two years from the end of treatment.

(VII) What degree of benefit may be expected from Nastin in those whom it fails to cure?

The answer to this is:—very considerable improvement, often approximating to cure, in the majority of cases and arrest of progress in every case except the most severe.

The percentages among the 47 Sylhet cases treated for 4 months and over are:—

Cured	...	...	...	...	17.0	per cent.
Greatly improved	...	...	...	...	25.5	"
Improved	...	...	...	...	44.7	"
Stationary	...	...	...	...	4.3	"
Worse	...	...	...	...	8.5	" (2 out of 4 due to intercurrent dysentery).
					100.0	

Another numerical estimate of the results of treatment can be made by taking the separate symptoms shown in Table (2). Thus, out of 316 symptoms complained of by the 47 patients, there were:—

Cured	...	...	...	...	...	15.2	per cent.
Greatly improved	...	...	...	...	...	22.1	"
Improved	...	...	...	...	...	40.2	"
Stationary	...	...	...	...	...	15.2	"
Worse	...	...	...	...	...	3.8	"
Doubtful	...	...	...	...	...	3.5	"
					100.0		

But these figures do not fully represent the possible benefit to be derived from Nastin. In many of the patients as well as in their individual symptoms improvement is still in progress and is not yet completed. About a third of the patients are still in the early stages of treatment.

It must also be remembered that many of the symptoms of leprosy are not curable even by a "therapia sterilans magna." Complete eradication of lepra bacilli from the system cannot repair the mutilations, the advanced muscular atrophy and contractures, old and extensive anæsthesia, or structural damage to the skin, special senses and other organs. Hence in many of the cases here reported, though such symptoms may perhaps have reached the full amount of recovery which is possible under the most perfect of cures, yet in Table No. (2) of results they may show as stationary or only slightly improved. So also in some of the cases all active leprosy processes may have been cured and the bacilli have become dormant or even completely eradicated, and yet the patients may not have attained "cure" in the sense in which I have applied the term in Table (1), or even have reached great improvement.

(VIII) How long must Nastin treatment be continued?

In Prokash Ram, a severe case of leprosy, treatment has been continued for three and a half years with steadily progressing benefit to the patient, amounting at last to "cure." Still further improvement is possible and I think he should continue to receive occasional injections.

In several other cases under treatment for one, two, and two and a half years improvement is still steadily progressing and is far from being complete.

In a few cases improvement was very rapid. In one "cure" was effected by four months' treatment and in another by 7. But the other "cures" have required from fourteen months to three and a half years, and "great improvement" is not often brought about in less than nine months and often needs a much more prolonged course. As a rule improvement is slow and gradual and does not begin to be apparent till several months' treatment have been completed, but some of the symptoms especially the pains and lepromata often improve decidedly within two or three months.

I therefore think that no limit can yet be put to the length of treatment required.

A few cases may derive full benefit from Nastin within six or nine months, but the vast majority certainly require to continue treatment for well over a year and many for two, three and even more years.

It is not surprising therefore that several observers who have tried Nastin for only two, three or four months have seen no good results from it. It cannot be said that Nastin will fail to do good in any particular case until at least a year's trial has been made.

(IX) *General conclusion.*—In my opinion therefore Nastin is a very valuable remedy for leprosy which is capable of curing not a few lepers, of restoring the health of the majority to a very considerable degree, and of arresting the progress of the disease, certainly for some years, in almost every case if treatment is started before the most advanced stages are reached.

Even if it only cures one case in five or six, and in a certain proportion fails to effect any decided improvement, it nevertheless constitutes a great advance in the treatment of leprosy.

The good effects are not as a rule rapidly striking. They are slowly and gradually developed and are often not easily observed. They are none the less found to be substantial when treatment is sufficiently prolonged and a careful estimate made of its results.

## ADDENDUM TO REPORT ON NASTIN IN SYLHET IN 1912.

It may perhaps add to the usefulness of this paper if I append a note on the results obtained by others who have experimented with Nastin, particularly as this is an official report and may be read by laymen who are unacquainted with the subject.

By no means all observers have succeeded in getting good results from the treatment. In fact the most contradictory reports have been published from different parts of the world and the value of Nastin is as yet far from being established.

The following is a complete list of all the hitherto published reports to which I am able to find reference, classified as favourable and unfavourable, of major and minor importance. Those of minor importance include experiments lasting for less than six months and some which are lacking in details:—

Name of Reporter and place of experiment, etc.	Number of cases.	Months under treatment.	Country of origin of disease.
1	2	3	4
<b>FAVOURABLE OF MAJOR IMPORTANCE.</b>			
Rodrigues at Matunga (1)— Patients felt livelier, could work better, stronger, lost their tingling sensations, and sleeplessness, old chronic ulcers healed.	23 And others for shorter periods.	8 (av.)	India.
Zeimann at Dualia, Cameroons (2)— Favourable results, but improvement came to a standstill	22	6—11	East Africa
Beauchamp Williams at Bushire (3)— Very good results, closely resembling those seen in Sylhet.	12	10 (av.)	Persia.
Anderson at Purulia (4)— Says Nastin is a real advance in treatment comparable to mercury in syphilis.	5	8 (av.)	India.
Rasid at Trombay (5) ... ..	3	13	India.
Scott at Sylhet— <i>Vide</i> this report ... ..	49	13 (av.)	India.
<b>FAVOURABLE OF MINOR IMPORTANCE.</b>			
Deycke and Reschad Bey— Appear to have made extensive and prolonged experiments, but never to have published them in detail.	?	?	Turkey.
Jackson at Kagrappeth (1) ... ..	9	3½ (av.)	India.
Smith and Bissect at Sehore (1)— Nodules and anaesthesia cured ... ..	6	4 (av.)	India.
Davidson at Travancore (4) ... ..	?	12	India.
Randalay at Thakurdwar (6) — ... ..		3	India.
Premananda Das at Deoghar (7) ... ..	2	2 weeks	India.
Gopal Chandra Chatterji at Calcutta (3) ... ..	3	1 (av.)	India.
Barnardo at Bhagalpur (8) ... ..	6	4	India.
Lie at Bergen (9) ... ..	3	3—18	Norway.
Kuppfer at Kuda (10) ... ..	?	?	Russia.
Peiper in German East Africa (11) ... ..	5	5	East Africa.
<b>UNFAVOURABLE OF MAJOR IMPORTANCE.</b>			
Wise at Mahaica, British Guiana (12) ... ..	135	16½ (av.)	South America.
Messum at Pretoria (13)— Patients experienced a temporary feeling of benefit, but no definite improvement resulted.	20	6—18	South Africa.
Kiwill at Wenden (9)— Three cases improved, six stationary, and five worse ... ..	14	12	Germany.
Brinkerhoff and Wayson at Hawaii (9)— Two cases showed slight changes, four unaffected ... ..	6	5—15	Pacific Islands.
Ashburton Thompson in N. S. Wales (9)— No results. Nastin an inert body ... ..	5	8 (av.)	Australia.
Kitasato at Tokio (9) ... ..	7	4—15	Japan.

Name of reporter and place of experiment, etc.	Number of cases.	Months under treatment.	Country of origin of disease.
1	2	3	4
OF MINOR IMPORTANCE.			
Clegg at Manila (14)— No improvement ... ..	9	17	Philippines.
Oscar Teague (14) ... ..	4	5	Philippines.
Megaw in Calcutta (8) ... ..	14	4½	India.
Rogers in Calcutta (4) ... ..	4	4	India.
MacLeod in London (9) ... ..	2	5 and 16	?
Lenz at Bagamojo (2) ... ..	6	.....	East Africa.

A few other observers have obtained indecisive results in a few cases, *viz.*, Kuhn in China (15), Sakagashi (16) and Kinoshita (16) in Japan.

Several of these reports I have not been able to obtain in original. I have seen only reviews or summaries of their contents.

It will be seen that the most important trial of Nastin hitherto published is that made in the Mahaica Leper Asylum of British Guiana and reported by Doctor K. S. Wise, Government Bacteriologist of the Colony. The treatment was used in this asylum for a period of 1 year and 10 months on 135 cases of leprosy. The average length of treatment was 16½ months and the maximum 22 months.

The Sylhet experiments will to the best of my knowledge constitute the second most important reported trial. The number of cases is fewer (49) and the average length of treatment less (13 months), but several cases have been treated for a considerably longer period (maximum 3½ years) than any in the Mahaica experiments.

I have naturally read the Mahaica report with much interest and attempted to compare the results with my own. The writer has however treated the subject on different lines from those followed by me and many other observers and I have found it difficult to make a satisfactory comparison. It is not easy in fact for the reader to judge what Doctor Wise's results actually were. His summary however is not at all favourable to Nastin and it appears that he saw little evidence in his cases of any decided benefit from its use.

The following is a brief comparative synopsis of the Mahaica and Sylhet results so far as it is possible to compare them.

Mahaica.	Sylhet.
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#### General Health.

The majority of patients felt better and lighter within a few weeks. Soon they were more able and willing to work. "Exactly how far this effect is due to Nastin and how far to hope and expectation it is difficult to decide. Such a cheerful and happier disposition in patients is a frequent accompaniment of new treatments for leprosy; certain it is however that the increased quantity of work done and the more cheerful demeanour have persisted nearly two years."

10.9 per cent. of cases restored to normal health and working power.  
67.4 per cent. greatly to slightly improved in these respects.  
21.7 per cent. stationary or worse.  
Increased cheerfulness and power of work marked feature.

#### Lepromata.

"Facial changes or naked eye changes of form (improvement) occurred in 13.3 per cent. of those cases showing nodular leprosy. Thus the great majority or 86.7 per cent. of these cases show no obvious change of condition."

Nastin appeared to have a tendency to initiate or intensify the natural process of ulceration of lepromata.

Cure of lepromata may take place both naturally and under Nastin by ulceration and extrusion of leprosy material with subsequent healing.

23.6 per cent. cured.  
64.7 per cent. greatly to slightly improved.  
11.7 per cent. stationary or worse.  
The lepromata have responded in a most marked way to treatment.  
The tendency to ulcerate was checked and never increased.  
This was never seen. Cure took place by absorption without ulceration.

*Anæsthesia and patches.*

Great difficulty experienced in mapping out the anæsthetic areas at all accurately.

(1) The anæsthetic maculæ on the body. In 32·7 per cent. the colour slowly returned to normal and sensation of touch and pain gradually returned. The majority were unaffected.

(2) The anæsthesia of extremities decreased markedly in area in the majority of cases, but in some again relapsed. Improvement remained permanent in 48·2 per cent.

Patches—

6·6 per cent. cured.

70·0 per cent. greatly to slightly improved.

20·0 per cent. stationary or worse.

Anæsthesia—

4·2 per cent. cured.

74·5 per cent. greatly to slightly improved.

17·0 per cent. stationary.

*Ulcers.*

No healing effect on any of the varieties of ulceration.

31·3 per cent. cured.

43·7 per cent. greatly to slightly improved.

24·1 per cent. stationary or worse.

*Kidneys.*

Nastin seemed to increase albumen and casts in the urine.

Not looked for. Very few cases had symptoms of kidney disease.

*General results.*

“It may be roughly estimated that 31 per cent. showed no change of condition; 48·6 per cent. began to improve and then remained stationary; 20·4 per cent. showed progressive and slow improvement.”

In three early cases the results approximated to a cure, but some early cases undoubtedly got worse.

“The favourable results are so few that more experience can alone determine whether they were cases of natural improvement irrespective of Nastin administration or whether Nastin played an active part in the disappearance of the leprosy deposits.”

40·8 per cent. cured or greatly improved.

45·0 per cent. improved.

14·2 per cent. stationary or worse.

Doctor Wise does not say whether he observed any changes in such symptoms as the pains, sleeplessness, loss of sexual power, muscular atrophy and contractures thickening of nerves, nose and eye symptoms and lymphatic enlargement.

On the other hand, he made extensive observations on the bacteriological changes in his cases. He finds evidence that the process of bacteriolysis proceeds normally in untreated leprosy and is often extensive. It is to be found in varying degrees and stages in different lesions of the same individual at the same time. For this reason it is difficult to judge the effects of treatment, but he thinks that Nastin may have some influence in stimulating this natural bacteriolysis, while there is nothing to show that it has any distinctive action of its own on the bacilli. He states that his observations on bacteriolysis were made by arbitrary and approximate methods and have only the roughest application, no accurate means of estimating the process being available. Doctor Wise also deals in full with the question of reaction.

These are matters of great interest and were evidently the subject of laborious work in the Mahaica asylum, but in the present state of our knowledge the meaning of bacterial changes and reactionary symptoms is quite uncertain. To the seeker after information as to the practical value of Nastin this report seems to be rather lacking in clinical details.

It contains enough however to show that the results in Mahaica were very much less promising than those obtained in Sylhet. While under the headings of general health, anæsthesia and patches the two reports both record improvement, the results as regards ulceration and lepromatous nodules are entirely different, complete failure being reported from Mahaica and marked success from Sylhet.

Some observers have reported even fewer good results than Dr. Wise, while others have recorded great improvement in almost every symptom. The effects of Nastin on the lepromata noted by the different experimenters furnish the most striking example of the contradictory nature of the reports published from various parts of the world. Some observers have recorded rapid absorption and disappearance of the nodules in most of their patients, while others have seen no such change and have even found the nodules to get worse or become seriously ulcerated.

This particular symptom is one which is easy to observe. Its changes can be to a considerable extent recorded by photography. Errors in observation, differences

In the points of view or methods of the different experimenters cannot account for these contrary results. Some explanation must be sought either in the Nastin itself, in the patients or in the type of leprosy under treatment.

(1) As regards the Nastin there is no reason to suppose that the preparation used has varied in kind or quality. It all comes from the same source (a firm in Biebrich) and it appears to keep well even in the tropics.

(2) As regards the patients, some races of mankind are probably more susceptible to leprosy than others and the more resistant would respond more readily to treatment than the less resistant. This might account for differences in degree as regards the benefit derived from Nastin, but hardly for such contradictory results as have been reported.

(3) There remains the question whether the different experimenters have been dealing with identically the same disease. I think it is quite possible they have not and I should like to suggest the following question:—Is the leprosy of Asia identical with that of Africa? Or is the leprosy of the Aryan races of Asia and Europe the same as that of the Negroid peoples on the one hand and the Mongolian on the other?

We know that leprosy is a very ancient disease. No doubt its virus had a single source and locality of origin (Egypt has been suggested), from which in remote times it spread over the world, but it is not at all improbable that offshoots of the parent stock have developed along different lines in different parts of the world where they may have been isolated from one another for thousands of years and have evolved specific differences.

What is known of the history of leprosy goes to show that the disease probably dates from before the historical era. Mention of it is to be found in the most ancient literature of Persia, Egypt, India, China and Japan. It has probably existed from ancient times in many parts of Europe and Africa. It has been found endemic among some of the remote tribes of central Africa. On the other hand, leprosy seems to be a new disease in America having been imported from Africa at the time of the slave trade, and in Australia whither the Chinese seem to have brought it.

If the disease was really so wide spread in the Old World before the dawn of history, it seems certain that the different offshoots of the original parent leprosy virus must have continued a separate existence isolated from one another for thousands of years, for till recent times inter-communication between the races of central and Southern Africa, the Aryans of Europe and Asia and the Mongolians of China and Japan must have been very small in extent. Under these circumstances it would be strange if such a comparatively simple organism as the bacillus or streptothrix of leprosy had maintained alike in all parts of the world the original characteristics of its parent stock. Changes, amounting perhaps to specific differences, in the biological sense, might be expected to have become evolved in the different offshoots. How many such species or strains of leprosy may have developed it is impossible to say, but we may surmise that at least three are to be found corresponding roughly to the three racial divisions of the Old World, *viz.*: (1) Aryan, in Europe and West and Southern Asia. (2) Mongolian, in North and Eastern Asia. (3) Negroid in Africa. The leprosy of Australia, the Philippines and Pacific Islands we may suppose to belong to No. (2) and that of America to No. (3).

This of course is the merest speculation, but it seems to furnish a possible explanation of the contrary reports on Nastin treatment published from different parts of the world.

Nastin is with very little doubt, though Professor Deycke has never asserted the fact, a kind of vaccine prepared from a culture of leprosy virus. The source of the virus was, I believe, a leper or lepers in Constantinople. The action of vaccines is generally accepted as being specific. If therefore there be any truth in my suggestion as to the existence of specifically different strains of leprosy, we might expect Nastin to have an active effect on the leprosy of Turkey and other Aryan countries, especially of Asia, while producing little or no change in lepers of distant parts of the world.

This as a matter of fact is actually found to be the case. In the list of reports given above it will be seen that almost all the experiments in India, Persia and Turkey have given good results, the European reports vary, the Far Eastern and Australian reports are all unfavourable, and the great majority of the experiments among the African races have been failures, including those of British Guiana.

If the explanation of these facts lies in the above suggestion, all that is needed to obtain uniform success throughout the world is to prepare the Nastin from

local leper in the country where it is to be used. An autogenous Nastin for each case would doubtless be ideal, but probably quite unnecessary.

In conclusion, I wish to draw attention to the almost universal success of Nastin in India. Out of 13 reports by experimenters in this country, 11, including all the most valuable, show good results. Only two reports of minor importance have been unfavourable. In both these the experiments were insufficiently prolonged. This being so, why should we in India be influenced by the results reported from other parts of the world. Seeing how little we know about the organism of leprosy and its possible variations, why should we hesitate to give our Indian lepers the benefit of a treatment which has been found so generally successful among them because we hear that it has not been equally successful in British Guiana or Japan.

**References :**

- (1) Trans. of Bombay Medi. Congress, 1909.
- (2) *Lepra*, Vol. IX, fasc. 1 and 2.
- (3) *Ind. Med. Gazette Supply*, November 1909.
- (4) Report to Government of Bengal, June 1910, by the Inspector General of Civil Hospitals.
- (5) *Brit. Med. Journal*, November 6, 1909.
- (6) Ditto ditto, April 29, 1911.
- (7) *Ind. Med. Gazette*, November 1911, p. 431.
- (8) Report to Government of Bengal, July 1912, by the Inspector General of Civil Hospitals.
- (9) Trans. of 2nd International Conference on Leprosy, Bergen, Vol. 3.
- (10) *Lepra*, Vol. VIII, fasc. 3.
- (11) *Arch. f. Schiff u. Tropen Hyg.* May 1910.
- (12) Report to Governor of British Guiana, March 1911, by Dr. K. S. Wise.
- (13) *Lancet*, July 30, 1910.
- (14) *Philippine Journal of Science*.
- (15) Annual Report, Leper Home, Tungkau, 1908.
- (16) *Jap. Zeitschrift für Dermat. u. Urologie*, Vol. VIII, 1908.

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Appendix to Report on Nastin in Sylhet  
for 1912.

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## APPENDIX TO REPORT ON

*Abstract of Notes of*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
1. Prokash Ram. Male. Age 40.	26th July 1908	Advanced mixed leprosy. Twenty years' history.  General health bad. Great weakness. Cannot work. Sexual power much diminished.  Much nodular thickening of features. Lepromata over whole body.  Anæsthesia to touch over whole of legs, thighs and back.  Erythematous patches.  Ulcers on feet. Loss of phalanges.	<i>From ulcer—</i> 26th June 1911, neg.  <i>From tubercle—</i> 2nd Mar. 1912, doubtful.  4th Oct. 1912, pos.
2. Knl Mistri. Male. Age 35.	31st Aug. 1910	Mixed leprosy. Six years' history.  General health poor. Weak but can do some work.  Pains throughout body. Sexual power present.  Much nodular thickening of face. Nodules on arms and legs.  Thickening of hands and feet.  Anæsthesia. Patches.  Ulceration of nose. Ulcers on soles.	<i>From tubercle—</i> 8th July 1911, pos. 22nd Dec. 1911, „ 13th Mar. 1913, „  Bacilli at last examination fragmentary and beaded.
3. Ghasia. Male. Age 32.	9th Aug 1910	Nerve leprosy. Two years' history. Recent progress rapid. He was a year in the asylum without improvement before beginning Nastin treatment.  General condition bad. Very weak. Very little exertion tires him. Gnawing pains over whole body. Sexual power lost.  Eyebrows and ears slightly thickened.  Anæsthesia to touch extensive on limbs.  Patches on skin. Fingers and toes atrophied, and contracted.  Ulceration of feet and hands.	<i>Ulcer—</i> 8th July 1911, neg.  <i>Thickened skin—</i> 4th Mar. 1913, neg.

## NASTIN IN SYLHET FOR 1912.

## Cases treated during 1912.

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
18th July 1909	3½ years, 121 injections.	...	<p>General health and strength practically restored to normal. Has been able to work like a healthy man and earn his living for the last two years. Can walk 25 miles in a day. Can use <i>dao</i> or <i>kodali</i> with ease. Sexual power normal.</p> <p>All thickening of the face has subsided leaving the skin wrinkled and in folds so that the leonine appearance is still present.</p> <p>All the original lepromata disappeared, but a few fresh ones formed 8 months ago and subsided again.</p> <p>Anæsthesia to touch now only in hands and feet; to hot and cold more extensive (not mapped on admission).</p> <p>No patches to be seen now. The ulcers all healed three months after treatment began and have not reformed.</p>	<p>From his point of view cured, but bacilli still present.</p> <p>Nearly all symptoms cured.</p>
Aug. 1910	2½ years, 83 injections.	...	<p>General health improved. Has gained 8 lbs. in weight. Capacity for work still much interfered with by cracked condition of hands and feet. Pains much better. Sexual power considerably improved.</p> <p>Nearly all the thickening of face has disappeared; alæ nasi remained a little thickened.</p> <p>Most of nodules gone. Those left continue to get smaller. No new ones have appeared in the last 8 months, but a few came out before that during treatment.</p> <p>Anæsthesia improved. Ulcers have all healed but he gets a cracked condition of hands and feet which is troublesome.</p>	<p>Arrest of progress.</p> <p>Great and still continuing improvement.</p>
17th Jan. 1911	2 years, 75 injections.	...	<p>Feels much better and stronger. Can walk 10 miles instead of only two. Has lost all his pains and largely recovered sexual power.</p> <p>All thickening of eyebrows and ears has disappeared and hair has returned to the eyebrows.</p> <p>Anæsthesia to touch has improved much. Now only in hands and left foot.</p> <p>Patches have nearly disappeared.</p> <p>Ulcers all healed 9 months after beginning treatment and have not recurred.</p> <p>Contraction of fingers has become rather worse.</p>	<p>Arrest of progress.</p> <p>Great improvement.</p>

## APPENDIX TO REPORT ON

*Abstract of Notes of*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
4. Karim Sheikh. Male. Age 28.	27th Aug. 1910	Mixed leprosy. Eight years' history.  Very weak and anæmic. "A pitiable sight." Cannot walk without a stick. Sexual power quite lost.  Some thickening of features. Small tubercles on arms and legs.  Anæsthesia extensive. Patches.  Ulcers on soles.	<i>Ulcer—</i>  28th June 1911, neg. 8th July 1911, "  <i>Tubercle, etc.—</i>  2nd Mar. 1912, pos. 3rd " 1913, "
5. Anuk Nath. Male. Age 65.	13th Apl. 1908	Nerve leprosy. Seven years' history.  An old man weak, anæmic and emaciated. Can do no work. Severe pain throughout body. Sexual power completely lost.  Anæsthesia extensive. Patches on skin.  Left ulnar nerve thickened. Night blindness.  Feet swollen. Finger thickened and distorted.  Ulceration of nose and feet. Loss of toes.	<i>Ulcer—</i>  23rd July 1911, neg. 4th Mar. 1913, "
6. Bapa Ram. Male. Age 35.	10th Apl, 1911	Mixed leprosy. Seven years' history.  Very weak. Can do no work and can hardly walk at all. Pains throughout lower extremities. Sexual power totally lost.  Anæsthesia. Tubercular thickening of features.  Fingers thickened. Feet swollen.  Ulceration of feet and nose. Loss of toes.	<i>Ulcer—</i>  24th Apl. 1911, pos. 22nd Dec. 1911, neg.  <i>Tubercle—</i>  3rd Mar. 1913, pos.
7. Chandra Kishore Sarma. Male. Age 42.	31st Sep. 1911	Nerve leprosy. Five or 6 years' history.  General condition bad. Very emaciated, weak and anæmic. Looks like a phthisical man. Has mucopurulent expectoration and cough. Pained in left leg. Sexual power much diminished.  Anæsthesia extensive on limbs. Patches on skin.  Paresis and much muscular wasting especially of right arm. Contraction of fingers.  Ulcers on left foot. Loss of one toe.	<i>Ulcer—</i>  2nd Oct. 1911, pos. 3rd Mar. 1913, neg.  Sputum found free from tubercle bacilli.

NASTIN IN SYLHET FOR 1912—*contd.**Cases treated during 1912—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
17th Jan. 1911	2 years, 76 injections.	...	<p>General health wonderfully improved. Can walk 5 or 6 miles without difficulty and work with <i>dao</i> or <i>kodali</i>. Pains nearly gone. Sexual power not returned.</p> <p>All thickening of face, hands and feet, and all lepromata have disappeared. Has a thickening over one elbow in which bacilli were found in March 1912.</p> <p>Anæsthesia improved, but still extensive.</p> <p>Patches still marked and fresh raised reddish patches are still coming out. Ulcers all healed.</p> <p>Has recently had dysentery and lost 10 lbs. in weight.</p>	Wonderfully improved within 6 months. Improvement maintained as regards all leprosy symptoms except patches.
18th Oct. 1910	1 year 9½ months, 58 injections.	23th July 1912	<p>General condition very fair for a man of his age. Pains much better than they used to be. No sexual power. Vision improved. Has recovered sense of smell.</p> <p>Anæsthesia probably better. Patches still visible.</p> <p>Ulcers all healed. Has regained the use of his hands, and can split bamboos with a <i>dao</i> which he could not.</p> <p>Was bad with dysentery in May, but has recovered.</p> <p>He left the asylum in July 1912, but returned in January 1913.</p>	Arrest of progress. Considerable improvement.
18th Apl. 1911	1 year and 8½ months, 66 injections.	...	<p>General health very greatly improved. Feet strong and well and could walk several miles but for ulcers on feet. Can work all day with <i>dao</i> or <i>kodali</i>. Sexual power now normal. No pains or tingling.</p> <p>Thickening of features very much diminished. Still has nodules in right ear. No thickening of fingers or swelling of feet now.</p> <p>Anæsthesia much diminished in area.</p> <p>No ulcers now, but some loss of superficial epidermis and fissuring in one place.</p>	Arrest of progress. Great improvement steadily continuing.
15th Aug. 1911	1 year 4½ months, 56 injections.	...	<p>General condition enormously improved. Can walk 6 miles easily. Could barely walk 2. Can write and use a <i>dao</i>, which powers were quite lost. Sexual power much better and still improving. Very little pain now.</p> <p>Anæsthesia improved. Patches less visible.</p> <p>The wasted muscles in limbs, especially right arm, have greatly improved in size and strength.</p> <p>The ulcers all healed, but recently a small one has formed again.</p>	Arrest of progress. Very great improvement steadily continuing.

## APPENDIX TO REPORT ON

*Abstract of Notes of*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
8. Bishon. Male. Age 30.	3rd Aug. 1911	<p>Mixed leprosy. Three years' history.</p> <p>General health poor. Is weak and a little exertion tires him. Pain in joints. Has lost his sexual power.</p> <p>Thickening of features.</p> <p>Anæsthesia extensive in the patches.</p> <p>Patches over body and legs.</p> <p>No ulcers.</p>	<p><i>Tubercle</i>—</p> <p>2nd Mar. 1912, pos.</p> <p>27th June 1912, „</p> <p>3rd Mar. 1913, „</p> <p>Bacilli at last examination few, scattered and not very acid-fast.</p>
9. Ram Charan. Male. Age 25.	27th Jan. 1909 and again on 29th Mar. 1912.	<p>Advanced case of nerve leprosy. Fifteen years' history.</p> <p>General health fair. Sexual power diminished.</p> <p>Anæsthesia fairly extensive.</p> <p>Reddish brown glistening patches.</p> <p>Contraction of fingers. Distortion of toes and absorption of whole of right metatarsus and part of tarsus. Ulcers on feet.</p>	<p><i>Ulcer</i>—</p> <p>10th Feb. 1913, neg.</p>
10. Bang Lal. Male. Age 40.	4th Feb. 1905	<p>Nerve leprosy. Eighteen years' history.</p> <p>General health poor. Weak. Slight exertion tires him. Pains in limbs. Sexual power much diminished.</p> <p>Anæsthesia extensive. Right ulnar nerve thick.</p> <p>Feet thickened and shortened. Fingers and toes distorted. Ulcers on soles. One toe lost.</p>	<p><i>Ulcer</i>—</p> <p>8th July 1911, neg.</p>
11. Barbeswar. Male. Age 20.	19th June 1911	<p>Nerve leprosy. Four years' history.</p> <p>General health fair but is weak. Severe headache and pains all over body. Loss of sexual power. No ulceration.</p> <p>Anæsthesia to hot and cold over patches.</p> <p>Many reddish shiny patches on body and limbs.</p> <p>Ulnar nerves much thickened.</p>	<p>Swabs from nose.</p> <p>2nd July 1911, neg.</p> <p>26th Aug. 1911, „</p> <p>No lesion for examination.</p>
12. Kinkar. Male. Age 36.	3rd Aug. 1911	<p>Nerve leprosy. Four years' history</p> <p>General health poor. Is weak and anæmic. Very little exertion tires him. Sleeplessness. Pains in all the joints. Sexual power partially lost.</p> <p>Slight thickening of eyebrows, hands and feet.</p> <p>Anæsthesia. Patches.</p> <p>Atrophy of muscles of forearms and legs.</p> <p>Many ulcers on hands and feet.</p>	<p><i>Ulcer</i>—</p> <p>22nd Dec. 1911, neg.</p> <p>2nd Mar. 1912, „</p> <p>5th „ 1913, „</p>

NASTIN IN SYLHET FOR 1912—*contd.**Cases treated during 1913—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
18th Aug. 1911	1 year 4½ months, 52 injections.	...	<p>Now feels as strong as he ever did. Can work hard all day. Has no complaint at all. Sexual power normal.</p> <p>Thickening of features almost gone. About 3 months after treatment began, a number of very small tubercles appeared on skin of limbs. They continued to come out for a few months and then stopped. Now they are going, but many are still to be seen. Bacilli were found in one of them.</p> <p>Anæsthesia greatly improved; only found in one cicatricial patch. Patches nearly all invisible.</p> <p>Has lost 5 lbs. in weight.</p>	<p>Practically cured.</p> <p>Nearly all his symptoms have gone.</p>
2nd Apl. 1911	1 year 4 months, 32 injections.	...	<p>General health much the same. He looks well, but says he is slightly weaker. Pains decidedly better. Sexual power less.</p> <p>Anæsthesia not improved. Thickening of legs same.</p> <p>Contraction of fingers probably a little better.</p> <p>Ulcers better but not healed. One new ulcer on hand.</p>	Progress of disease arrested, but no definite improvement.
18th Oct. 1910	1 year 3½ months, 43 injections.	14th Feb 1910	<p>Left asylum of his own accord, distinctly improved and gaining weight. Felt much better, had lost all his pains and recovered some sexual power.</p> <p>Anæsthesia improved. Thickening of feet much less.</p> <p>Still had ulcers on soles but one had healed.</p>	Arrest of progress. Considerable improvement.
8th July 1911	1 year 3 months, 51 injections.	14th Oct. 1912	<p>Looks fat and healthy. Feels great improvement. Can now walk all day (only 2 miles on admission). Can work well with a <i>dao</i>. All pains gone. Sexual power completely returned. Sensation to hot and cold has returned in all the patches on body, but is still lost on parts of the limbs. Maculae still evident. Ulnar nerves still much thickened.</p> <p>Left the asylum of his own accord.</p>	<p>Practically cured.</p> <p>Has returned to work.</p>
11th Sep. 1911	1 year 3¼ months, 53 injections.	...	<p>General health greatly improved. Can walk 6 or 8 miles. Could hardly walk 2. Can work with <i>dao</i> or <i>kodali</i>. Pains much diminished but still sleeps badly. Sexual power has returned to normal.</p> <p>Thickening of eyebrows gone. Swelling of feet subsided.</p> <p>Anæsthesia improved. The atrophied muscles have very much improved in size and strength.</p> <p>Ulcers still numerous on both hands and feet. Some have healed and some new ones have formed. He says they are better on the whole.</p>	Arrest of progress. Considerable improvement.

## APPENDIX TO REPORT ON

*Abstract of Notes of*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
13. Tangmit. Female. Age 50.	18th Feb. 1911.	Slight mixed leprosy. Five years' history.  General health fairly good. Complains of pains throughout body which prevent sleep.  One small tubercle on chin. Slight thickening of features.  Anæsthesia. Patches all over body.  No ulcers. Hands and feet normal.	<i>Tubercle</i> —  8th July 1911, pos.
14. Chamru. Male. Age 50.	27th Feb. 1906	Nerve leprosy. Nine years' history. General health poor. Cannot work much or walk without stick. Pains. Sexual power not much altered. Fingers and toes deformed.  Some thickening of face. Anæsthesia. Muscular atrophy of forearms and hands. Ulcers.	<i>Ulcer</i> —  22nd Dec. 1911, neg.  2nd Mar. 1912, „  4th „ 1913, „
15. Harai Ram. Male. Age 34.	28th. Aug. 1911	Mixed leprosy. Twelve years' history.  General health bad. Very weak. Cannot lift any thing heavy. Pains all over body. Sexual power partially lost.  Thickening of features. Multiple lepromata.  Anæsthesia extensive.  Ulcers. Warty growth on dorsum of foot.  Swelling of hands and feet.	<i>Tubercle</i> —  1st Sep. 1911, pos.  22nd Dec. 1911, „  27th June 1912, „
16. Magha. Male. Age 60.	9th May 1902	Nerve leprosy. Twelve years' history.  General health fair. Complete loss of sexual power.  Anæsthesia. Thickening of ulnar nerves.  Thickening of right foot and ankle. Ulcer on right foot.  Atrophy and distortion of digits.	<i>Ulcer</i> —  22nd Dec. 1911, pos.  4th March 1913, neg.
17. Toona. Male. Age 28.	15th Feb. 1904	Nerve leprosy. Eighteen years' history.  Noted in 1910.—General condition very poor. Weak and anæmic, pains all over body. Sexual power diminished.  Anæsthesia. Reddish patches on arms and thighs.  Contraction and distortion of fingers and toes.  Ulcers on both feet. Loss of digits.	<i>Ulcer</i> —  22nd Dec. 1911, neg.  2nd March 1912, „  4th March 1913, „

NASTIN IN SYLHET FOR 1912—*contd.**Cases treated during 1912—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nasti treatment.	Net result.
5	6	7	8	9
21st Feb. 1911	1 year 2 months, 38 injections.	29th May 1912	<p>She died of cholera. She was practically cured of her leprosy. All the pains disappeared.</p> <p>The thickening of features and the tubercle on the chin completely disappeared.</p> <p>Sensation returned to all anæsthetic parts.</p> <p>The patches became much less conspicuous.</p>	Practically cured.
19th Oct. 1911	1 year 2½ months, 52 injections.	...	<p>Was improving up to September. Felt better and stronger and had lost his pains. Anæsthesia improved.</p> <p>In September, however, he got dysentery and has had relapses ever since which have much reduced him. Lost 14 lbs. weight.</p> <p>His ulcers have not improved.</p>	Somewhat worse. Was improving till attacked by dysentery. Progress of leprosy checked.
3rd Sep. 1911	1 year 2½ months, 49 injections.	15th Nov. 1912	<p>Left the asylum of his own accord, feeling much better and stronger. Can walk further than he could and can lift heavy weights. Can use a <i>dao</i> with his right hand which he could not do before. Gained 6lbs in weight. Pains much better. Sexual power not improved.</p> <p>Thickening of face all gone leaving skin in loose folds.</p> <p>Lepromata have subsided on body and upper arms, but many new ones have formed on forearms since treatment began and are still forming.</p> <p>Anæsthesia not improved.</p> <p>Ulcers and swelling of feet much better.</p>	Considerable improvement, but new lepromata are still forming.
25th Nov. 1911.	1 year and 1 month, 48 injections.	...	<p>He is an idiot and is difficult to examine.</p> <p>General health satisfactory. Says he feels well and has no pain.</p> <p>Anæsthesia seems to be the same.</p> <p>The ulcer has become covered with epidermis but is still moist and discharging.</p>	Arrest of progress. Slight improvement.
15th July 1910, again 11th Sep. 1911.	1 year and 1 month, 43 injections.	...	<p>General health improved. Not anæmic now. Has regained normal sexual power. Pains only in right foot. Says he has got a little weaker in the last 3 months.</p> <p>Can feel touch in many places where he could not.</p> <p>Patches marked by shrivelling of skin and loss of pigment no longer red.</p> <p>Contraction of fingers considerably improved. Can work with his hands now.</p> <p>Ulcer on left foot has healed. That on right foot remains and has lately got a little bigger.</p>	Ditto ditto.

## APPENDIX TO REPORT ON NASTIN

*Abstract of Notes of Cases*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
18. Golak Mali. Male. Age 45.	26th Nov. 1911	Mixed leprosy. Three years' history.  General health poor. Is weak and has much pain. Sexual power nearly lost. Suffers from universal scabies.  Thickening of features and prepuce.  Some nodules on forearms and legs.  Anæsthesia not extensive. Ulnar nerves enlarged.  Ulceration of nose and feet. Glandular enlargement.	<i>Ulcer</i> —  22nd Dec. 1911, pos.  <i>Tubercle</i> —  4th Mar. 1913, „
19. Abdul Rahim. Male. Age 32.	22nd Jan. 1912	Nerve leprosy. Sixteen months' history.  General health fair. Slight weakness, especially in legs. Pains.  Some thickening and puckering of eyebrows.  Anæsthesia extensive.  Patches on face arms and body.  Ulcers on both great toes.	<i>Ulcer</i> —  25th Jan. 1912, neg.  2nd Mar. 1912, „  5th Mar. 1913, „
20. Hira. Female. Age 28.	25th Feb. 1912	Nerve leprosy. Two years' history.  General health fair. Some weakness in legs. Can only walk a short way. Pains in legs at times.  Anæsthesia not extensive. Patches.  Ulnar nerves thickened.  Swelling of hands and feet. Some contraction of fingers.  Three ulcers on feet.	<i>Ulcer</i> —  28th Feb. 1912, neg.  2nd Mar. 1912, „  5th Mar. 1913, „
21. Bishahin. Female. Age 32.	25th „ „	Mixed leprosy. Two years' history. Recent progress rapid.  General health poor. Weak and anæmic. Very easily tired. Can only walk ¼ mile. Pains all over body. Night blindness.  Anæsthesia. Ulnar nerves thickened. Slight wasting of hand muscles. Patches.  Much thickening of features. Many lepromata.  Many ulcers on feet.	<i>Tubercle</i> —  2nd Mar. 1912, pos.  5th Mar. 1913, „
22. Jagdeo Kurmi. Male. Age 20.	19th May 1911	Nerve leprosy. Five years' history. He is a convict.  General condition fairly good. Has lost some strength and sexual power. Has gnawing pains.  Anæsthesia extensive.  Brownish red patches on body.  Toes thickened. Fingers contracted.  Two perforating ulcers on soles.	<i>Nose</i> —  28th June 1911, neg.  <i>Ulcer</i> —  8th July 1911, „  2nd Mar. 1913, „

IN SYLHET FOR 1912—*contd.**treated during 1912—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
3rd Dec. 1911	1 year and 1 month, 46 injections.	...	<p>General health still poor. His pains have gone.</p> <p>Nodules disappeared.</p> <p>His ulcers have healed, but he still has some "raw" surfaces on hands and feet.</p> <p>Otherwise not improved. Nose still discharges. Scabies still very bad.</p>	Arrest progress. Some improvement.
24th Jan. 1912	11 months, 43 injections.	...	<p>Much better and stronger. When he came it took 7 days to walk from his home. Now he thinks he could walk there in one day. Pains better, but still present below the knees. Thickening of eyebrows less.</p> <p>Anæsthesia much the same. He thinks it is better.</p> <p>Patches almost disappeared.</p> <p>Still has 3 ulcers. They healed up once but reformed. They are small.</p>	Arrest of progress. Considerable improvement.
2nd Mar. 1912	11 months, 37 injections.	...	<p>General condition improved. She has gained 8 lbs in weight, feels stronger and better, and can walk a mile or two without difficulty. Pains better.</p> <p>Anæsthesia, she says, much improved.</p> <p>Patches nearly invisible.</p> <p>Fingers somewhat straighter.</p> <p>Still has one ulcer (size of one rupee) on right foot.</p>	Arrest of progress. Some improvement.
2nd " "	11 months, 37 injections.	...	<p>General condition much improved. Feels considerably stronger. Can walk 2 or 3 miles. Can use a <i>dao</i> which she could not do on admission. Pains nearly gone. Night blindness cured.</p> <p>Features much more normal in appearance, still nodular.</p> <p>Lepromata getting less. Three fresh ones came out in first 3 months of treatment. Since then no new ones have formed.</p> <p>Anæsthesia improved.</p> <p>The ulcers were all healed, but one small shallow one has recently formed.</p>	Arrest of progress which was rapid. Considerable improvement.
8th July 1911	10 months, 32 injections.	18th May 1912	<p>Released on expiry of sentence. Condition much improved. Stronger. Can work with a <i>dao</i> which he could not do on admission. Sexual power returned. Pains only in one foot.</p> <p>Sensation returned everywhere except in right foot.</p> <p>Patches almost invisible.</p> <p>Still some thickening of feet. Fingers have straightened out considerably, he can use them more.</p> <p>Ulcer on left sole healed. Still one on right sole.</p>	Arrest of progress. Great improvement.

## APPENDIX TO REPORT ON NASTIN

*Abstract of Notes of Cases*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
23. Kishtonia. Male. Age 23.	13th Oct. 1905	Nerve leprosy. Nine years' history. Severe case. General condition very poor. Anæmic and very weak. Cannot walk without a stick. Can do no work. Sexual power abolished. Anæsthesia. Paresis and muscular wasting of legs. Ulnar nerves thickened. Fingers thickened and distorted. Loss of toes. Ulcers on feet.	<i>Ulcer</i> — 22nd Dec. 1911, neg. 2nd Mar. 1912, „
24. Chairmon. Female. Age 38.	28th Mar. 1912	Slight case of nerve leprosy. Eight years' history. General health fair. But she is weak and can only do light work. She used to carry heavy loads up and down hill. Cannot sleep on account of pain. Some impairment of vision. Anæsthesia extensive. Patches on limbs. No ulcers, thickenings or deformities. Came to asylum with two sons who were distinct lepers.	Swab from nose. 22nd Apl. 1912, neg. No lesion for examination.
25. Narsin. Male. Age 15.	29th „ „	Son of above woman. Nerve leprosy. Five years' history. General health fair, but is weak and easily tired. Cannot do any hard work. Pains in joints. No sexual power. Anæsthesia extensive. Ulnar nerves thickened. Slight muscular wasting in hands. Patches in many places. One deep ulcer on left sole.	<i>Ulcer</i> — 1st Apl. 1912, neg. 22nd „ „ „ 4th Mar. 1913, pos. Bacilli few and fragmentary, acid-fast debris.
26. Azar. Male. Age 10	5th Apl. 1912	Severe case of mixed leprosy. Two years' history. Progress of disease rapid. General health poor. Anæmic. Easily tired. Sleeps badly. Some thickening of features. Many lepromata. Anæsthesia extensive. Patches all over body and limbs. Ulnar nerves thickened. Muscles of hands slightly wasted. Ulcers on right foot. Nasal discharge.	<i>Tubercle</i> — 7th Apl. 1912, pos. 3rd Mar. 1913, „ On last occasion bacilli fragmentary and beaded.
27. Kailash Mali. Male. Age 23.	12th Sep. 1911 again 20th Aug. 1912.	Nerve leprosy. Ten years' history. General health poor. Very weak. Gets palpitation if he walks $\frac{1}{4}$ mile. Has gnawing pains. Sexual powers slightly decreased. Anæsthesia, not extensive. Patches. Some thickening of skin of nose and cheeks. Swelling of hands and forearms. One small ulcer on foot. Some obstruction of nose.	<i>Ulcer</i> — 22nd Dec. 1911, neg. 7th Mar. 1913, pos.

## IN SYLHET FOR 1912—contd.

treated during 1912—contd.

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
19th Oct. 1911	10 months, 35 injections.	13th Sep. 1912	Died of gangrene of foot. At first he felt somewhat better and lighter for treatment and had some return of sensation. He then got an attack of fever, and later hæmatu ia and finally an abscess followed by gangrene.	Worse after temporary improvement.
7th Apl. 1912	9 months, 31 injections.	...	General health improved. Stronger. Thinks she could walk 20 or 25 miles in a day, but not carry loads. Now has very little pain. Vision improved. Anæsthesia improved, but still fairly extensive. Many of the patches have disappeared, and the others are much fainter.	Arrest of progress. Considerable improvement.
31st Mar. 1912	9 months, 34 injections.	...	He has had dysentery off and on for several months which has reduced his weight by 6 lbs. and his strength. He feels better however and his pains are much less. Sexual power has returned to some extent. Sensation to hot and cold returned in several places. He thinks anæsthesia decidedly better. Patches almost entirely disappeared. Only one visible. The ulcer is still present, but is shallower and getting slowly smaller.	Ditto ditto.
15th Apl. 1912	8½ months, 30 injections.	...	Feels much better and stronger. Sleeps well. Can use <i>daw</i> or <i>kodali</i> now; could not on admission. Thickenings on face have become soft. Nodules on hands and arms have nearly disappeared. There are still many dozens on legs, but all are getting smaller. Only two new nodules have appeared in the asylum. Anæsthesia improved. Some patches have disappeared and the others are more normal in colour. Still some nasal discharge but can breathe more freely through nose. Ulcers all healed.	Arrest of progress which was previously rapid. Great improvement.
24th Sep. 1912	7 months, 21 injections. Absent for 9 months.	...	He was decidedly better. Could walk all day. Sexual power improved. But in October 1912 he got an attack of fever and paraplegia and nearly died. Now he has recovered again but is weak, has slow and slurred speech tremor, slight inco-ordination and slightly spastic gait. Has lost all his pains. No patches visible. Thickening of face and hands all gone. Uleer healed. He has some obstruction and discharge from nostrils.	Considerable improvement in most respects. His illness may or may not have been due to his leprosy.

## APPENDIX TO REPORT ON NASTIN

*Abstract of Notes of Cases*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
28. Balo Miri. Male. Age 35.	31st May 1912	Mixed leprosy. Ten years' history.  General health fair. Weak and easily tired. Pains all over body.  Features thickened. Tubercles on ears and one on foot. These are recent developments.  Anæsthesia. Patches.  Ulnar nerves thickened. No ulcers.	<i>Tubercle</i> —  2nd June 1912, pos.  3rd Mar. 1913, „  Bacilli not very acid-fast on second examination.
29. Muladhor. Male. Age 25.	14th June 1912.	Mixed leprosy. Three years' history.  General health poor. Very weak. Can do no work. Can only walk with difficulty. Burning pains. Dimness of vision. Sexual power much lessened.  Thickening of features, prepuce and scrotum.  Nodules on limbs. Fingers, feet and toes enlarged.  Anæsthesia. Ulnar nerves thickened.  Ulcers on toes, fingers and one ear.	<i>Tubercle</i> —  16th June 1912, pos.  7th Mar. 1913, „
30. Kamala Kanta Deori. Male. Age 25.	30th June 1912.	Mixed leprosy. Five years' history.  General health fair. Feels weak, but can walk for 6 hours in cool weather. Can do some work, but soon tires. No ulceration.  Thickening of features and scrotum. Nodules in ears.  Anæsthesia. Patches.	<i>Tubercle</i> —  4th July 1912, pos.  7th Mar. 1913, „  Bacilli fragmentary and beaded on second occasion.
31. Kabil ... ..	28th May 1912	Mixed leprosy. Five years' history.  General health fair, but is weak and cannot do hard work. Pains all over body. Loss of sexual power. No ulceration.  Nodular thickening of features. Patches.  Anæsthesia extensive. Ulnar nerves thickened. Loss of knee jerks. Night blindness.	<i>Tubercle</i> —  20th June 1912, pos.
32. Churamoni. Male. Age 20.	21st Aug. 1912.	Mixed leprosy. Two years' history  General health poor. Gets fever often. Weak. Can do no work. Can walk a mile with difficulty. Can use a <i>dao</i> very little. Pains. Sexual power nearly lost.  Thickening of features, nipples, elbows and scrotum. No definite nodules. Lymphatic glands enlarged.  Anæsthesia. Patches.  Hands and feet thickened and scarred. No ulcers. Occasional nose bleeding.	<i>Thickened nipple</i> —  25th Aug. 1912, neg.  <i>Tubercles</i> —  14th Sep 1912, pos.  3rd Mar. 1913, pos.

IN SYLHET FOR 1912—*contd.**treated during 1912—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
6th June 1912	7 months, 26 injections.	...	<p>He has gained 6 lbs. in weight. Strength as on admission. Pains better.</p> <p>Thickening of face less. Nodules still present. No fresh ones have appeared during treatment.</p> <p>Anæsthesia much improved.</p> <p>Cutaneous patches are more distinct and some fresh ones have appeared recently.</p>	Considerable improvement. New patches still appearing.
20th June 1912	6 months, 24 injections.	...	<p>Now looks well and fat. Has gained 10 lbs. in weight.</p> <p>Feels well and stronger than he did. Can walk 4 miles easily and do a little work. Pains better. Vision clearer. Sexual power improved.</p> <p>Thickenings all much diminished. Nodules smaller. No new ones since admission.</p> <p>Anæsthesia improved.</p> <p>All ulcers healed. Feet and hands less swollen.</p>	Arrest of progress. Great improvement.
30th " "	6 months, 23 injections.	...	<p>Says he is not much stronger than on admission but thinks he could walk all day with some difficulty.</p> <p>Thickening of features less and of scrotum nearly disappeared. Nodules nearly disappeared.</p> <p>Some return of sensation.</p>	Arrest of progress. Some improvement.
30th May 1912	5½ months, 23 injections.	20th Nov. 1912	<p>Left the asylum before a complete note of progress was made.</p> <p>He felt somewhat better and his pains were less.</p>	Arrest of progress. Probably little change.
25th Aug. 1912	4 months, 16 injections.	...	<p>Feels stronger and better. Can walk 2 miles without difficulty. Can do more work with <i>dao</i> or <i>kodali</i>. Pains better. Sexual power improved.</p> <p>All thickenings distinctly less.</p> <p>Sensation returning in arms.</p> <p>Patches now invisible.</p> <p>Feet and hands still swollen and glands still enlarged.</p> <p>No bleeding from nose now and respiration freer through nostrils.</p>	Arrest of progress. Considerable improvement.

## APPENDIX TO REPORT ON NASTIN

*Abstract of Notes of Cases*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
33. Darga Koch. Male. Age 35.	5th Sep. 1912	Nerve leprosy. Two years' history.  General health fair. Can walk 12 miles. Gnawing pains. Sexual power normal.  Anæsthesia. Ulnar nerves slightly thickened.  Contraction of fingers. Thickening of left foot. Papillomatous growth in one place.  Lymphatic glands enlarged.  Ulcers on left foot and both hands. Phalanges of left big toe have necrosed and come out.	<i>Ulcer—</i>  17th Sep. 1912, neg.  7th Mar. 1913, „
34. Guru Charan. Male Age 36.	8th Aug. 1911 and again 28th Feb. 1912.	Nerve leprosy. History doubtful.  General health bad. Complains of great weakness with dysentery, enlarged spleen, and pains in joints. Sexual power lost entirely for several years.  Anæsthesia. Patches. Enlarged inguinal glands.  Thickening of skin of feet.  Ulcer on right sole and sores over great trochanter.	<i>Ulcer—</i>  28th Feb. 1912, neg.  2nd Mar. 1912, „
35. Gobind. Male. Age 30.	3rd Feb. 1912	Advanced nerve leprosy. Twenty-three years' history. Brought to asylum in moribund condition with bedsores and many ulcers.  Extensive anæsthesia.  Some thickening of features.  Deformities of hands and feet.  <i>The following cases were treated as outpatients on Lakatura tea</i>	<i>Not examined.</i>
36. Rabi. Male. Age 24	...	Early nerve leprosy. Six months' history.  General health good, but is somewhat weaker than he used to be. Sexual power diminished.  Anæsthesia to hot and cold in forearms, ankles and feet, to H and C and to touch in patches.  Patches rough, thick, and pale in colour.  Thickening of ulnar nerves.  No other symptoms. Father and aunt are lepers.  Patches coming out rapidly lately.	No lesion for examination.
37. Budhu. Male. Age 25.	...	Advanced mixed leprosy. Six years' history.  General health bad. Very weak and emaciated. Lost all sexual power. Can walk only half a mile and do no work. Sleeps badly due to pains.  Much thickening of features and skin over knees and elbows. Multiple lepromata.  Anæsthesia. Ulnar nerves thickened. Vision affected. Ulcers.  Enlargement and deformities of hands and feet.	<i>Tubercle—</i>  17th Feb. 1913, pos.

IN SYLHET FOR 1912—*contd.*  
*treated during 1912—contd.*

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	Net result.
8th Sep. 1912	4 months, 14 injections.	...	<p>Feels much better and stronger. Has gained 8 lbs. in weight. Thinks he could walk 16 miles. Pains much less.</p> <p>He thinks anæsthesia slightly better on legs.</p> <p>Swelling of feet much less. Papillomatous growth quite disappeared.</p> <p>Glandular enlargement less.</p> <p>Only one small and shallow ulcer left.</p>	Arrest of progress. Considerable improvement.
2nd Mar. 1912	3 months, 10 injections.	27th May 1912	<p>General health improved. Strength increased so that he can do garden work. Sexual power returned. Still has pains.</p> <p>Ulcers all healed.</p> <p>He absconded from the asylum before a complete note of progress was made.</p>	Some improvement.
7th Feb. 1912	2½ months, 10 injections.	24th Feb. 1912	The ulcers became gangrenous and he sank gradually and died without improvement.	Worse. Died.
<i>estate. They did not come to the asylum and they followed their ordinary occupations.</i>				
30th Sep. 1911	1 year 3 months, 19 injections.	...	<p>Strength has returned. Sexual power now normal.</p> <p>Sensation to hot and cold normal in hands and forearms (where it was lost) except patches, and improved in feet.</p> <p>Patches much improved: roughness and thickening all gone and colour more normal: some nearly disappeared.</p> <p>No fresh patches since treatment began.</p> <p>Gained 6 lbs. in weight.</p>	Arrest of progress which was rapid. Great improvement.
30th " "	Ditto ...	...	<p>Feels much better and stronger. Can walk 12 miles. Cannot do much work on account of thickening of hands and feet. Pains only in ankles. Sleep well. Sexual power returned to some extent.</p> <p>Thickening of features nearly all gone, but still nodules in ears. Elbows and knees better.</p> <p>Lepromata greatly improved. Some have disappeared and all are better. No new nodules have appeared for a long time.</p> <p>Anæsthesia better. Ulcers all healed.</p> <p>Hands and feet still much enlarged.</p>	Arrest of progress. Great improvement.

## APPENDIX TO REPORT ON NASTIN

*Abstract of Notes of Cases*

Name, age, sex, etc.	Date of admission.	Condition and principal symptoms before Nastin treatment.	Results of microscopical examination.
1	2	3	4
38. Chand Moni. Female. Age 32.	...	Slight case of nerve leprosy. Twenty years' history.  General health fair, but complains of much weakness and tingling pains.  Anæsthesia to hot and cold and light touch.  Patches: light coloured and rough. Hair falling out. Ulnar nerves thickened. No ulcers.  Progress as regards the appearance of new patches and increasing weakness has been rapid within the last year.	No lesion for examination
39. Margu. Male. Age 32.	...	Nerve leprosy. five years' history.  General health fair. Complains of inability to do hard work. Pains.  Anæsthesia. Ulnar nerves much thickened.  Thickening and deformity of feet and ankles.  Contraction of left fingers. Ulcers.  His aunt is a leper.	Ulcer—  9th Mar. 1913, neg.
40. Goona Moni. Female. Age 18.	...	Very slight case of nerve leprosy. One and a half years' history.  General health good, no constitutional symptoms of any kind.  Has a large light coloured patch roughened and anæsthetic on one side of face. A similar patch on one leg.  No other signs or symptoms. Her mother is a leper.	No lesion for examination

## IN SYLHET FOR 1912—concl'd.

treated during 1912—concl'd.

Date when Nastin began.	Period under treatment and number of injections.	Date of discharge.	Condition at end of Nastin treatment.	Net result.
5	6	7	8	9
25th Oct. 1911	1 year 2 months, 19 injections.	25	<p>General health better. Is working now, but can not do much work on account of loss of power on the hands. Pains better.</p> <p>Anaesthesia improved.</p> <p>Patches a little more normal in colour.</p> <p>Very little hair falls out now.</p> <p>Two small ulcers formed after the second injection, but soon healed again. No ulcers now.</p>	Arrest of progress. Some improvement.
25th " "	1 year 2 months, 18 injections.	25	<p>Feels much better and stronger. Still does not work because of contraction and weakness of hands and ulcers on feet. Pains better.</p> <p>Anaesthesia improved. Ulnar nerves seem less thickened.</p> <p>Ulcers on hands and left foot have healed. Only one now on right foot, and that is nearly healed.</p> <p>Contracted fingers are a little more moveable.</p>	Ditto ditto.
14th Mar. 1912	9½ months, 15 injections.	25	<p>Looks well and fat. Says she has gained strength. Gained 4 lbs.</p> <p>Both patches are decidedly less conspicuous, though not smaller. The inner margin of the patch on face has become indistinct.</p> <p>Sensation to hot and cold has returned to the inner portion of the facial patch.</p>	Ditto ditto.





